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JULY 1917
VOLUME XXVII ~ NUMBER 1

DEVOTED TO THE ART AND SCIENCE OF BUILDING
ROGERS AND MANSON COMPANY PUBLISHERS

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NEW YORK ROGERS AND MANSON COMPANY, Publishers BOSTON

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Published Monthly by
ROGERS AND MANSON COMPANY
85 Water Street, Boston, Mass.
Advertising Department, 42 West 39th Street, New York
Yearly Subscription, payable in advance, U.S.A., Insular Possessions and Cuba $5.00
Canada ..... $5.50 Foreign Countries in the Postal Union 6.00
Single Copies ..... 50 cents All Copies Mailed Flat
Trade Supplied by American News Company and its Branches. Entered as Second Class Matter, March 12, 1892, at the Post Office at Boston, Mass.
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XVIITH CENTURY PALACE AT TUDELA, ARAGÓN, SPAIN

CONSTRUCTED OF BRICK WITH STONE TRIM AND GREAT WOODEN CORNICE

THE ARCHITECTURAL FORUM
FOR QUARTER CENTURY THE BRICKBUILDER
VOLUME XXVII JULY 1917 NUMBER 1

One-Story and Open-Air Schoolhouses in California

By WILLIAM C. HAYS

THE one-story and open-air school building, as recently developed in California, is no novelty. When, nearly two thousand years ago, young Saul of Tarsus journeyed up to Jerusalem to sit with others "at the feet of Gamaliel," it was into an open-air school that he went to hear the distinguished Doctor of the Law. In the temple's outer court Saul met with the free-born youth of his group, out in the open, under a vibrant, clear Oriental sky. When, for a time, the weather conditions became less favorable, it was a simple matter to withdraw into the high portico which surrounded the courtyard, and which offered protection from storm or a too sultry sun. When biting winds swept down from the snow-clad mountains of Lebanon, a lee behind some sheltering wall, with perhaps a brazier of glowing coals, helped to make conditions more endurable. So, still, in the unchanging East, one may see the schools of to-day with their semi-isolated groups of scholars, whose ages vary all the way from ten years to young manhood. Mustered "at their master's feet," their recitation goes on, with sway of body and chanting of voice; learning, as in ancient Jerusalem, the Mosaic Law; in modern Cairo, the Koran.

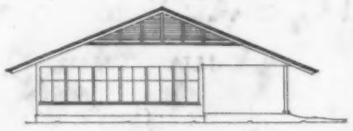
It was so for the sons of the well-to-do and free-born classes. Less fortunate youths of the East had no such protection but followed their teachers about, to be taught in any chance spaces or recesses along the wayside or, at least, where street commotions were least disconcerting. All the East, throughout all times of history, has had its schooling in the out of doors.

In Greece of classic times, even more strikingly than in the countries lying along the southeastern shores of the Mediterranean, there was a marked similarity to conditions as they exist in present-day California. This resemblance extends farther than to such externals as climate or other natural environment. There were those more significant phases of the school problem which are derived from a social organization wherein the life of every individual man was, to a degree, a vitally interwoven thread in the fabric of the state. The Greek schools were boys' schools, always and exclusively. During the life period corresponding to our children's grade schools, each boy, attended by his individual *pædagogue*, went for instruction to some *didaskalos*, or schoolmaster. The institutions conducted by these masters had no connection with the state, but were private enterprises of varying degrees of popularity. Their instruction was given for the most part out of doors, although the more substantial and prosperous masters had buildings, furnished and equipped more or less completely, according to the bulky and complicated needs of their day. The buildings themselves seem to have been mostly in the nature of colonnades, lightly constructed, for it is related how in a school at Chios the collapse of its roof caused the deaths of all but one of the hundred and twenty boys in attendance.

Greek youth, like the youth of all other regions having a warm climate, matured early, so, at the age of sixteen, the young Greek's education became a charge of the state, for it was then that he was freed from the attendance of his *pædagogue* and entered the gymnasium. Perhaps, in the course of time, though never within the scanty budgets provided for our schools, either private or public, we moderns may acquire some such equipments as ancient Greece provided for the training of her young men, as exemplified in the Gymnasia—the "Academy," and the "Lyceum" of Athens, for example.

"The gymnasia were spacious edifices, surrounded by gardens and a sacred grove. The first entrance was by a square court, two *stadia* (twelve hundred feet) in circumference, encompassed with porticoes and buildings. On three of its sides were large halls, provided with seats, in which philosophers, rhetoricians, and sophists assembled their disciples. On the fourth were

rooms for bathing and other practices of the gymnasium. The portico facing the south was double to prevent the winter rains, driven by the wind, from penetrating into the interior. From this court one passed into an enclosure, likewise square shaded in the middle by plane trees. A range of colonnades extended round three of the sides. That which fronted the north had a double row of columns, to shelter those who walked there in summer from the sun. The opposite piazza was called *xystos*, in the middle of which, and through its whole length, they contrived a sort of pathway . . . where, sheltered from the weather, and separated from the spectators ranged along its sides, the young scholars exercised themselves in wrestling. Beyond the *xystos* was a stadium for foot-races."



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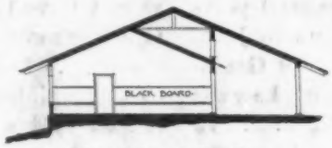


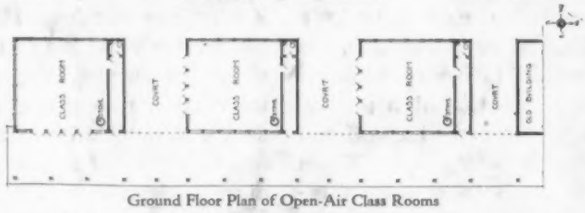
Section through Class Room

The "Groves of Academe," by the way, furnish us more than one close, human contact between ancient and modern times, for the site itself had been provided by a reclamation project in a method quite like those of our own day. A low-lying malarial district of marshy land, having been bequeathed to the state by Ecadamos, was drained and planted with trees, just as only a few decades ago the modern Italians reclaimed the death-dealing malarial district between Salerno and Pæstum.

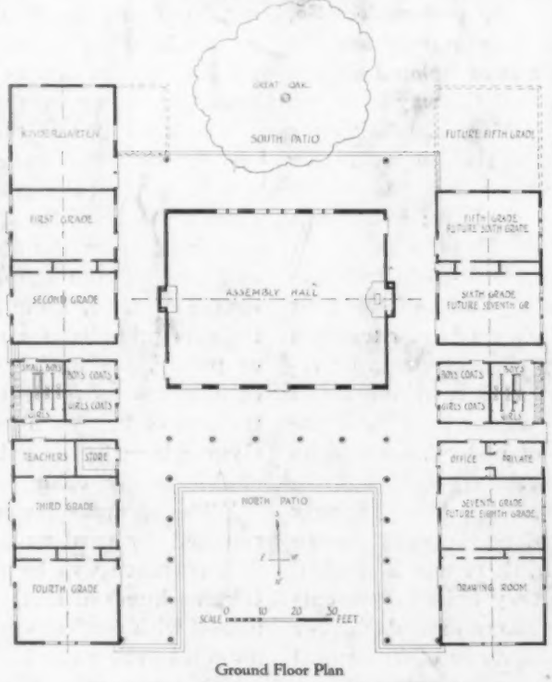
It was out doors, in the shaded walks and large free spaces of the Academy, that Aristotle taught, as he had previously done at Stagira.

For purposes of comparison it is enlightening to bring together these antique equipments and our own Pacific Coast schools of similar type. One will find striking similarities in the conditions which have created the types, as well as between the types themselves. Let us note the marked geological and climatic resemblances between the country along the eastern Mediterranean shore and the California seacoast lands.

California! A blue summer sea; seeming endless mountain ranges follow the coast, sometimes jutting out into headlands, elsewhere turning back from the shore line to make room for a few sun-sparkling bays; the swift, steep coast water courses cut bank-full to overflowing for a short period of the year, only to sink under the sands and boulders during long, protracted seasons of dry weather. The temperature throughout the year varies but little. In summer there are a few days, perhaps ten of them, of considerable heat, and in winter about the same number of cold days, when thin ice forms over small bodies of sheltered water. If these few extremes are eliminated, it is doubtful whether the difference in average summer and winter temperatures would exceed ten degrees—almost the climatic condition of Sicily's east coast.



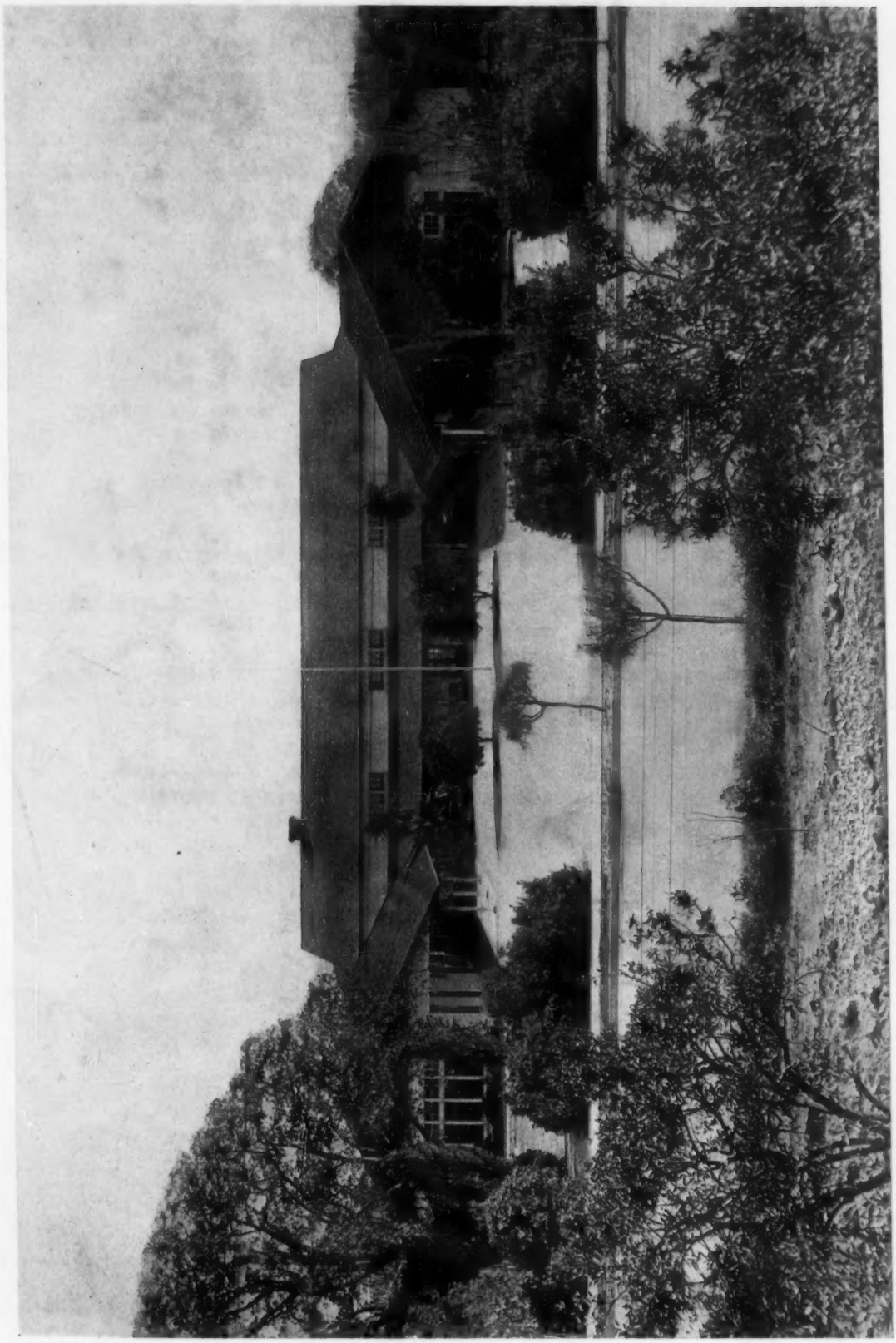
Ground Floor Plan of Open-Air Class Rooms
Additions to Polytechnic Elementary School, Pasadena, Cal.
Elmer Grey, Architect



Ground Floor Plan
Polytechnic Elementary School, Pasadena, Cal.
Myron Hunt & Elmer Grey, Architects

Likewise there is a strong resemblance between the *flora* of the two countries, so marked, indeed, that the Californian traveling the Mediterranean borders, or the Greek or Italian brought to the Pacific Coast, would feel equally at home.

This, of the coast country—leaving the coast behind, however, and going inland, differences of temperature become so marked that in California one may suffer from cold on the Fourth of July and from heat on New Year's



GENERAL VIEW LOOKING INTO NORTH PATIO
POLYTECHNIC ELEMENTARY SCHOOL, PASADENA, CAL.
MYRON HUNT & ELMER GREY, ARCHITECTS

VIEW OF NORTH PATIO

VIEW ALONG OPEN-AIR CORRIDOR

POLYTECHNIC ELEMENTARY SCHOOL, PASADENA, CAL.

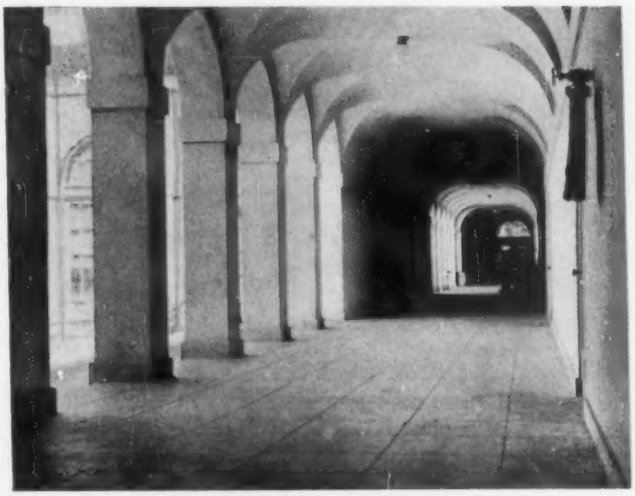
MYRON HUNT & ELMER GREY, ARCHITECTS

Day, for conditions vary all the way from the tropical Imperial Valley to the glacial higher Sierras.

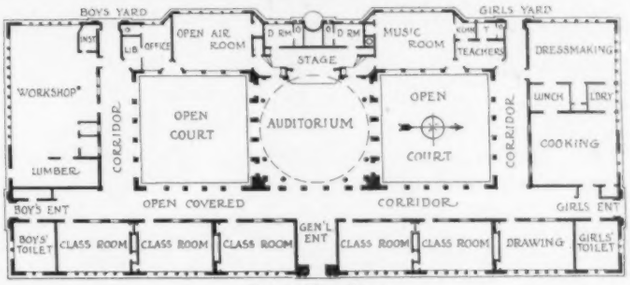
Conditions vary, too, even in the same region; as, for example, around San Francisco Bay, where ten or twelve miles of local travel will take one into entirely dissimilar exposures and climate. In one district one finds chill, fog-laden winds sweeping in sometimes day after day straight from the sea; in another, under the shelter of the forested coast-range hills and far enough south (or north) to be clear of the Golden Gate fog zone, it is balmy and often almost too warm.

What, then, is the type of school building indicated by natural conditions in the coast country of California? The one-story, open-air type which logically came into being ages ago in ancient Greece.

It will be interesting to analyze some recent expressions of this type. In its simplest form, the unit which goes to make up the one-story school building is the schoolroom lighted on one long side and paralleled by a corridor on the other. Such a room has no distinguishing quality, and no special virtue, but is in all respects like the basic unit of the "stuffy," multi-storied type of



Corridor, Garfield Intermediate School, Berkeley, Cal.

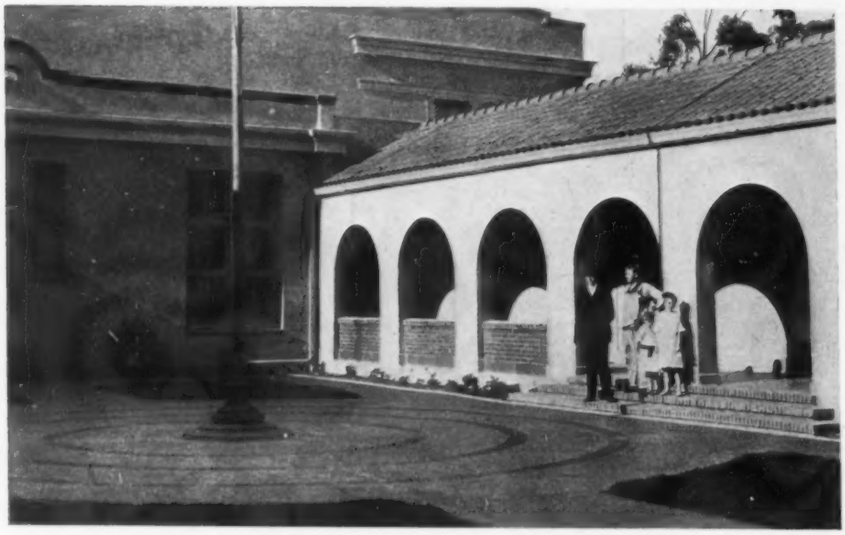


Ground Floor Plan

Garfield Intermediate School, Berkeley, Cal.

Street Elevation, Garfield Intermediate School, Berkeley, Cal.

Coxhead & Coxhead, Architects

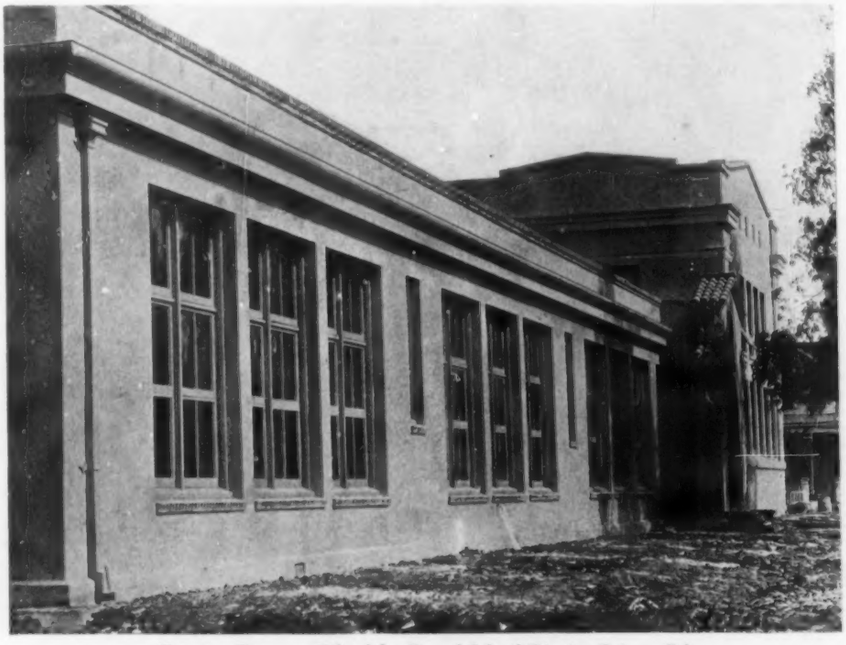


Patio, Grammar School for Crystal School District, Suisun, Cal.

building all too common everywhere. When, as has sometimes been done, two such rooms are built side by side, with a closed corridor between them, at least one (and that, perhaps, the most important) object of the one-story type of schoolhouse, namely, airiness, is to all intents and purposes defeated, even though the windows may open largely toward courts or gardens. This arrangement loses sight, completely, of the fundamental desire to improve hygienic conditions in the class room. There is no possibility of good "natural" cross ventilation, and the weight of testimony from experienced teachers (at least in California) is all on the side of natural ventilation as against any artificial system, even the most perfectly designed. It is, of course, necessary that adequate provision should be made for artificial heating when needed, and especially to keep the floors dry and warm. This is an "open" country—open doored, open windowed, open minded. But the "open minded" among teachers, as well as among the more interested of the parents, seem to be of one opinion,—that artificial ventilation will not do here.

Accepting this point of view, then, one naturally looks to cross ventilation of some sort, and this means not merely the providing of small, theoretical vents and louvres in the wall opposite the windows, but of large openings on the entrance side of the room, the doors ordinarily being left open. Thus there enters a new factor, for under certain conditions there is danger of too nearly equalized bi-lateral lighting. However, it is found, that when the open corridors are broad enough, the little light entering the class rooms from them is so diffused that it serves a highly useful purpose and softens the shadows cast by the usual "left shoulder" illumination. Another, and far from negligible function of these broad corridor openings will be brought out in discussing the psychology of the one-story, open air schoolroom in a paper to follow.

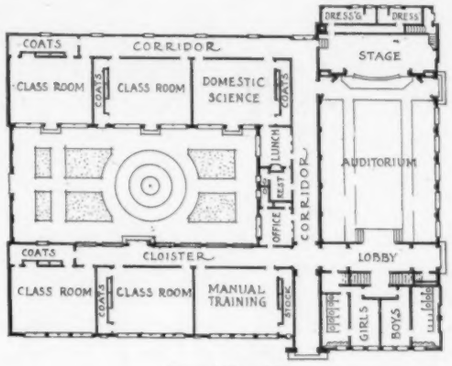
It is this type of unit, then, that is accepted as



Exterior, Grammar School for Crystal School District, Suisun, Cal.

the basic feature for repetitions, many or few, in the composition of the school plan. It is the type, no matter what modifications may be dictated by local conditions, mainly climatic, such as exposures to sweeping winds and rains, or local averages in temperature.

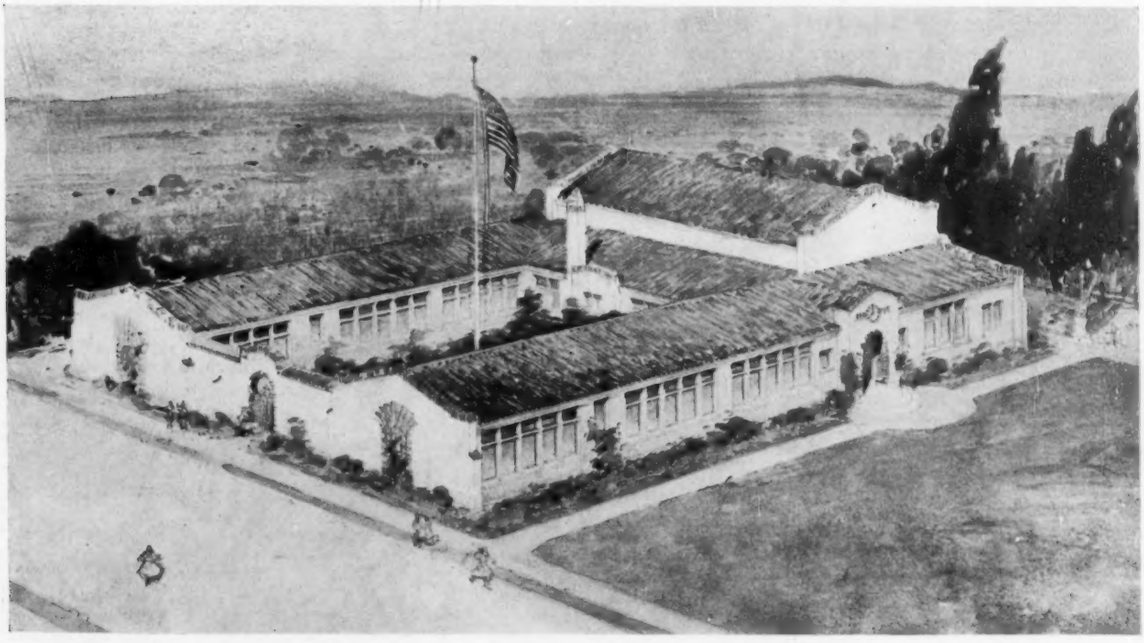
When ranges of these units are planned to form and enclose two or three sides of a court, the court becomes a playground. These typical "room-and-corridor" units are arranged usually in long, parallel series, the corridors generally facing inward, although sometimes conditions of climate, exposures to unpleasant prevailing winds, or other causes indicate a better arrangement; as, for example, where the wings are exact repetitions, but without reversing room and corridor to the right and left of a central axis. Sometimes irregularities of site, steep grades or property boundaries which are other than at right angles may dictate corresponding irregularities in plan. Not infrequently, too, there may result unsymmetrical arrangements when natural growths of trees are to be reserved. Some of these irregular arrangements are most charming and picturesque, and they gain much from the informality which will, for example, leave the broad-spreading shadow under a gnarled live oak, to give shelter from the sun in the midst of the school's open court yard.



Ground Floor Plan

Position of the corridors in wings is due to the direction of prevailing winds

Probably the earliest, and still, without doubt, among the best of all the buildings of this type which have come under my notice, is that of the Polytechnic (formerly "Throop") Elementary School at Pasadena, of which Myron Hunt and Elmer Grey were the original architects, and Mr. Grey the architect of the subsequent additions. As it is the best, so it is the simplest and least pretentious — least removed from the home environment to which the average child is accustomed. Coming here to school, the child has no need of mental or spiritual readjustment; his day's activities continue as usual, but merely in a changed location. During his hours at home his life goes on mostly in the garden, under trees, porch, or pergola; it is so, too, while he is attending school. Looking out



Bird's-eye Perspective View

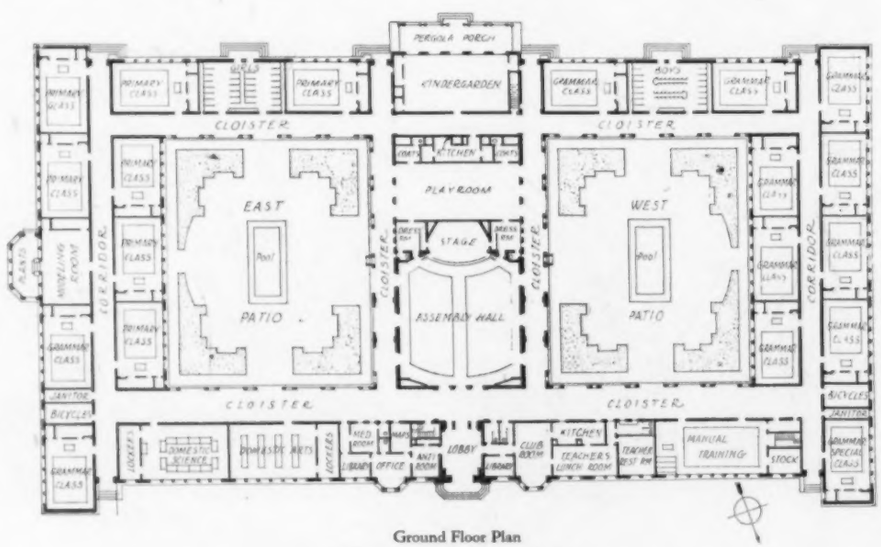
Grammar School for Crystal School District, Suisun, Cal.

Edwin J. Symmes and Wm. H. Crim, Jr., Associate Architects

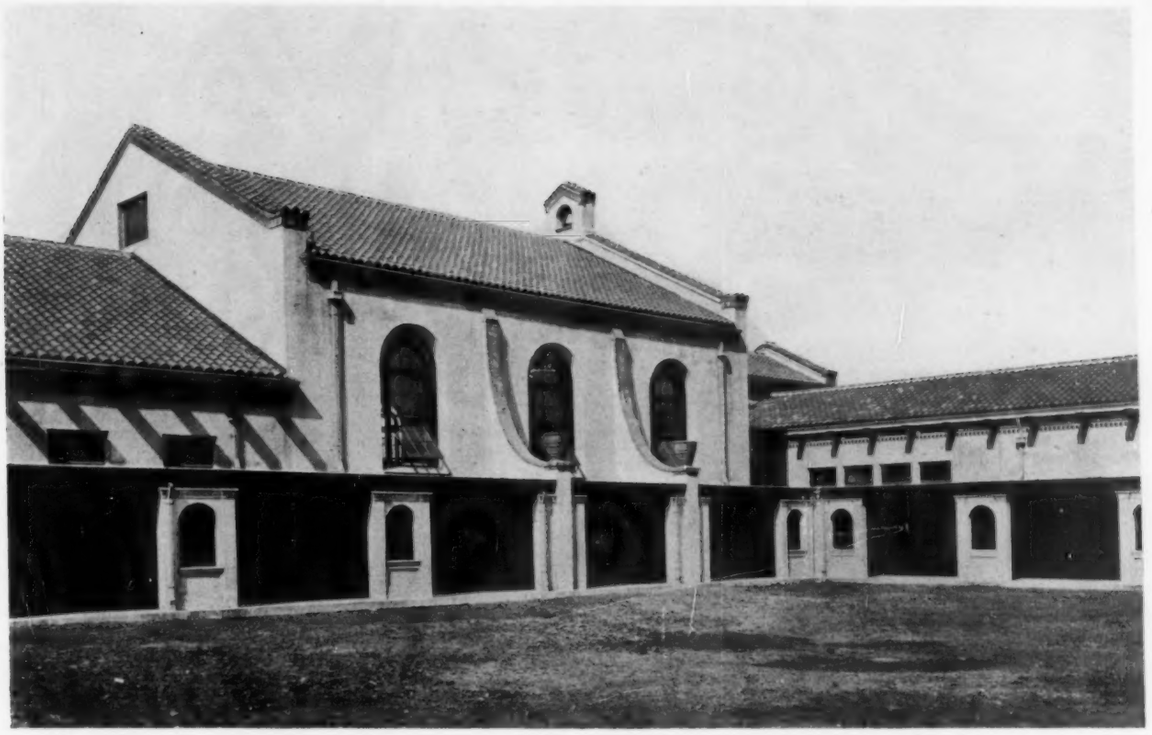
Terrace of McChesney Elementary School, Oakland, Cal.
John J. Donovan, Architect
This terrace would be greatly improved by being brought into closer association with nature, as in the case of the Pasadena Polytechnic School

through the light, scrim curtained windows of the class rooms into which he comes, one may see "a stretch of green grass, with here and there a tree, and one or two twisted vines craning their necks to find out what goes on inside." To be sure, other children are congregated with him there, but they are only his many friends; his broadened family circle. A teacher guides his studies and joins in his play — so would his mother or older sister, were he yet at home. His allotted times with given studies are not long and although he uses books, he proves that the school which provides occupations need seldom set tasks. He studies within wide-open doors and beside great, cool, shaded passageways. He is accustomed to visitors, who may quite naturally stop a moment to glance into the room. Nor are these visitors always grown-up "humans." While I was looking about the school an inquisitive robin hopped across the cement floored passage from the garden, passed over the broad threshold into a class room, and cocking his head to one side, then to the other, "sized up" the situation, turned, and went back outdoors. It was significant that the bird's coming was taken as a matter of course: no child stopped his occupation, and only one or two nearest the door seemed conscious of the visit. A teacher told me that even when stray dogs unexpectedly made free with the open doorway, there was no more distraction, and I was reminded by contrast of one far-off time when a fox terrier at large visited the chapel service in my own college days.

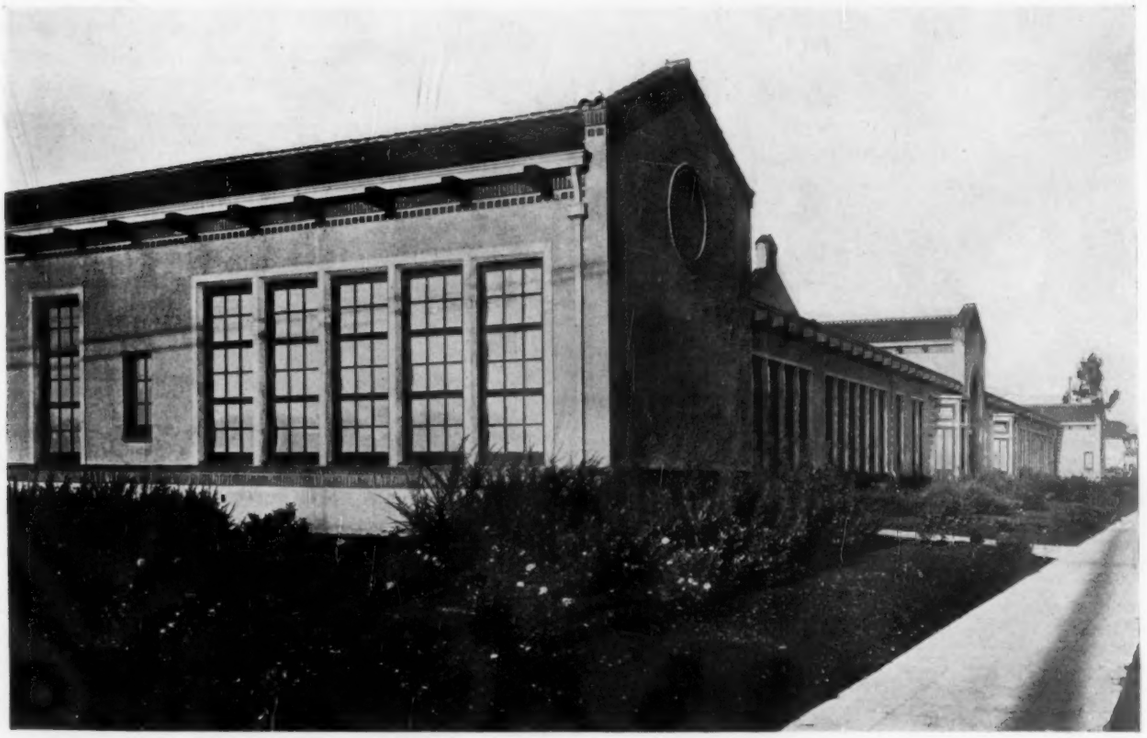
Is there some special virtue in the unpretentious type of this building at Pasadena? I think so. At the University of California we now gather our architectural classes in quarters of most plainly temporary construction. From the beginning the place has borne an intimate name — "The Ark." (There was, indeed, a striking resemblance between our original small building and the Noah's Ark of a by-gone childhood.) Some day, with the development of the University's permanent buildings, we shall be housed in splendid fireproof quarters — perhaps within cut granite walls. Will a spiritual something, evasive and precious, lose its way on the moving day? Personally, I have my fears!



Ground Floor Plan
Emerson School, Oakland, Cal.
John J. Donovan and John Galen Howard, Associate Architects



VIEW IN PATIO LOOKING TOWARD ASSEMBLY HALL



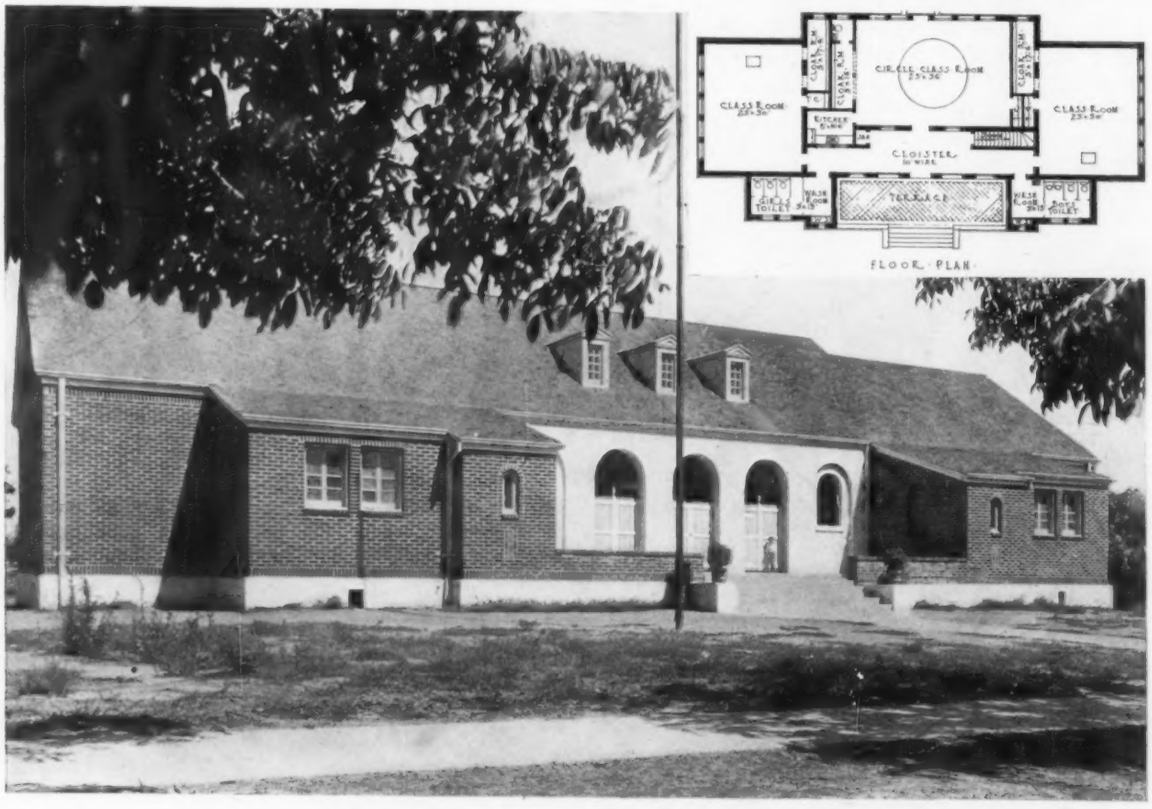
GENERAL VIEW LOOKING ALONG STREET

EMERSON SCHOOL, OAKLAND, CAL.

JOHN J. DONOVAN AND JOHN GALEN HOWARD, ASSOCIATE ARCHITECTS

GRAMMAR SCHOOL, AZUZA, CAL. ALLISON & ALLISON, ARCHITECTS

In proportion and simple handling of inexpensive materials this school is comparable with the Pasadena Polytechnic School



MARENGO PRIMARY SCHOOL, ALHAMBRA, CAL.

ALLISON & ALLISON, ARCHITECTS

The Motion Picture Theater

II. PLANNING FOR SIGHT AND PROJECTION LINES

By CHARLES A. WHITTEMORE

NOTWITHSTANDING the fact that much has been written on the subject of theater construction, and that plans and sections of many theaters have been published in the architectural press, there is a lamentable lack of knowledge on the part of many in the architectural profession as to the requirements of a theater whether it be of the legitimate type, a vaudeville house, or motion picture theater. The principal stumbling block aside from purely technical questions, such as electrical layout, stage equipment, etc., seems to be in regard to sight lines and, while there is no special trick or concealed knowledge about this particular factor in theater construction, many architects seem to approach the layout of a theater with a great deal of hesitancy on account of the terrors which the sight line problem holds for them.

It may be well to analyze the steps necessary to determine the various divisions of a house before giving in detail the elements involved in a solution of the sight line problem.

After the lot has been selected the number of seats required is settled. This at once determines whether the plan shall include a balcony, or balcony and gallery, or be a single division type of house. The sight lines of this latter type are so simple that for the sake of the complexity of the problem the multiple division type will be discussed, which naturally will include the other.

The arrangement of lobbies, stairs, and elements beyond the limits of the auditorium need not here be considered, although because of the fundamental building law requirements these factors limit the seating capacity. Before the layout of the balcony and gallery can be definitely determined, the lobbies and stairs must be at least tentatively located, as these elements control the rear balcony and gallery wall line, if the lobbies immediately precede and are at the same level as the rear rows of seats. Where the mezzanine lobbies and "vomitories" are adopted, these considerations do not exist with the same force, although they are still factors in the final determination of the seating capacity.

Having located these components the next consideration is how low to keep the balconies; what "head room" over the rear row of seats on the floor; what "clearance" under the front portion of the balcony soffit is necessary. In the determination of these points the structural members need careful consideration. Assuming that all the features have been provisionally established, the sight line layout is to be next worked out.

The width of the steppings in balcony and gallery should never be less than 2 feet 6 inches and better 2 feet 8 inches if space will allow. The platform for the front row of seats should be at least 3 feet wide and the same space should be allowed for the rear row. These distances are particularly important in balcony and gallery as the steppings are not easily changed when once constructed. The same dimensions should apply to the seat spacing in the orchestra floor, but as this floor is usually unbroken, the layout need be exact only to determine the location of the stand up rail.

The distance from the front of the balcony or gallery rail is also important as too great an "overhang" prevents the possibility of a free, open appearing auditorium, and the patrons in the rear under these "overhangs" feel as though they were in a tunnel. It is not possible to determine the distance for every theater on the same basis, but if the depth of the balcony equals the distance from the front to the curtain line, a good effect may be obtained.

When these essentials have been all tentatively located it is necessary next to determine the minimum amount of stage, scenery, settings, auditorium, etc., necessary to be seen from the least desirable seats; how much of the width of the back wall of the stage the auditorium as a whole should be enabled to have in the range of vision; how much of the height of the proscenium should be seen from the back of the auditorium on the orchestra floor and in the balcony; how much of the stage and orchestra should be visible from the gallery.

Having determined these points it is simple enough to draw lines indicating these rays of vision on the section and to arrange the constructional members of the various parts of the house so as to permit an unobstructed view within the limits of these predetermined lines. For example, if in Fig. 1 a point be taken on a line 4 feet below the level of the stage and 2 feet in advance of the curtain line, on the main axis of the auditorium, and from this point a line be drawn to the top step at the back of the balcony, and if another line be taken from a point, say, 18 feet up on the

curtain line and carried to a point 4 feet above the floor level at the back row of seats in the orchestra floor, the intersection of these lines immediately locates a point at the front of the balcony, and the angle of the line from the point below the stage floor previously referred to will determine the exact pitch of the rows of seats of the balcony. The line indicating the pitch of the seats, it will be noted, passes through a point 2 feet 6 inches in front of the first riser in the balcony, rather than through the exact front of the balcony level itself, and in case a broad aisle is used as an intermediate, the steppings to the rear of the broad aisle will be higher than those of the front, thus preserving the same general sight lines.

In a similar manner, if a line be taken from a point 4 feet above the back row of seats of the balcony to a point, say, 18 feet above the stage on the side of the proscenium arch, this line together with the sight line from the point below the stage to the top step at the back of the gallery will determine the front of the gallery; and the pitch of the seats in the gallery can be determined in the same manner as for the balcony.

The sight lines above referred to inscribe various spaces which are assumed to be in a plane with the main axis line of the auditorium. The same principle may be followed in determining the sight lines from any seat in the house, always revolving the plane of the sight line into the plane of the axis, in order to facilitate the projection on the main section.

The arrangement of lines as described will constitute a sight line arrangement which is as nearly ideal as the practical side of the problem will permit, and in case of extreme congestion in space or if it is desired for any special purpose to get a greater seating capacity than this layout would permit, the sight line points may be taken on the curtain line 4 feet below the stage, rather than on a point 2 feet in advance of the curtain line. It must be borne in mind, however, that as this sight line point is moved toward the back of the stage, each interval toward the rear decreases the visible

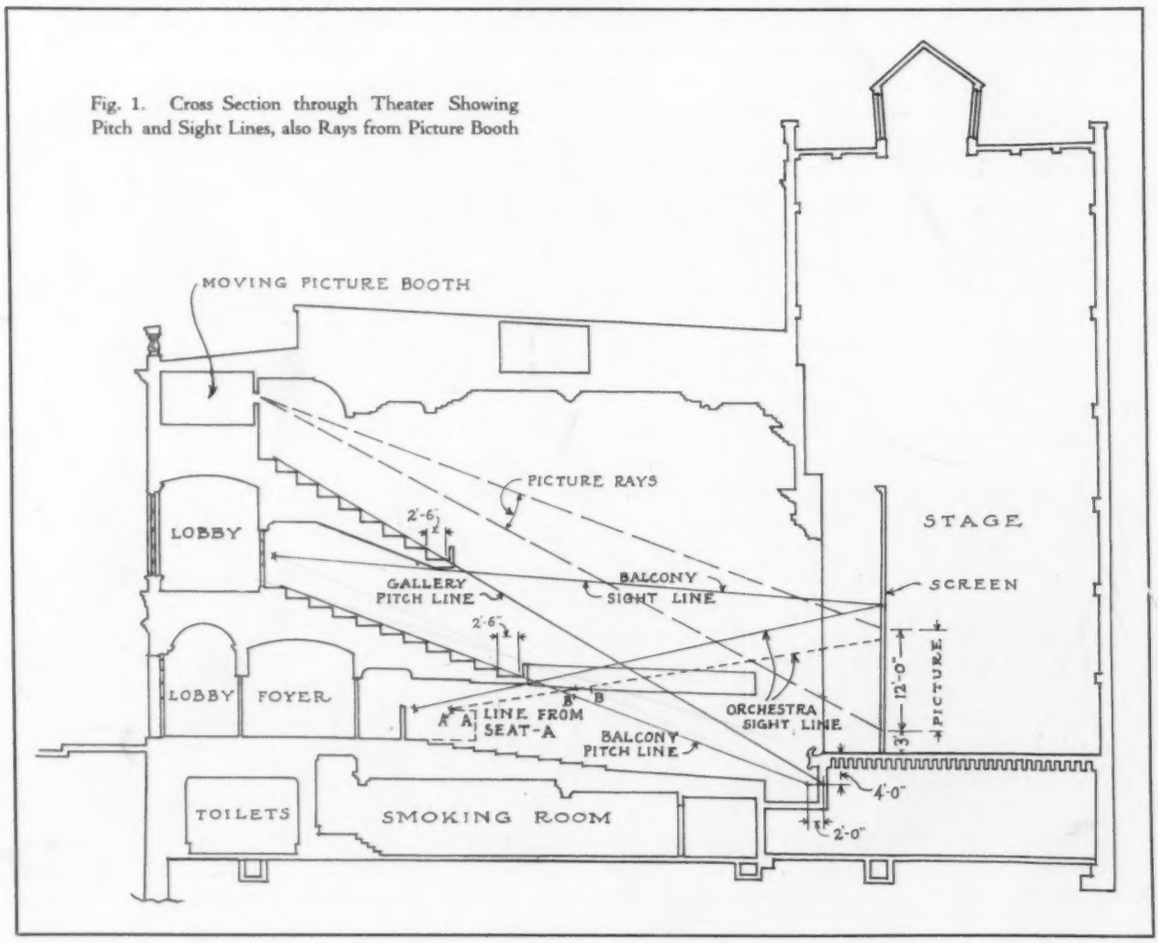


Fig. 1. Cross Section through Theater Showing Pitch and Sight Lines, also Rays from Picture Booth

spaces on the orchestra floor from the balcony and gallery.

This, however, is not the whole of the sight line problem. As the seats are laid out on concentric curves the sight line at the extreme right or extreme left of the auditorium naturally flattens so that the front of the balcony or gallery cuts off more or less of the sight area from the seats in the back of the gallery or the seats at the back and side of the balcony. The method of determining the limiting points under these conditions is exactly the same as was followed in establishing the sight lines along the axis of the auditorium in that it is a simple matter of projection. Where the sight line from the back row of seats in the balcony cuts the rail of the boxes, if there be such, or cuts the rail of the balcony front, the intersection should be projected to the axis line of the auditorium, and the intersection of the sight line with the point 2 feet in front of the curtain line and 4 feet below the stage should also be projected to the axis line of the auditorium. In other words, the extreme seats are revolved about a point at the edge of the proscenium opening into a plane parallel with the axis of the auditorium. This gives the proper plane in which to lay out the sight lines for the extreme seats.

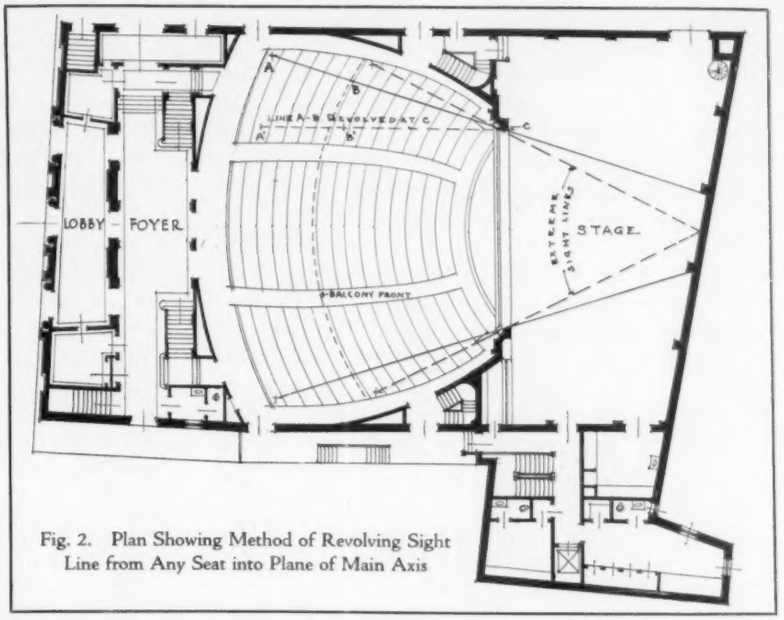


Fig. 2. Plan Showing Method of Revolving Sight Line from Any Seat into Plane of Main Axis

In the same way the rotation of the extreme seats on the orchestra floor into a plane parallel with the axis line of the auditorium as illustrated in Fig. 2 will show immediately how much of the predetermined sight space is cut out by the camber or curve of the balcony soffit, and makes possible an adjustment of the balcony soffit to increase or decrease the range of the sight line from the extreme seats.

While a description of the method of working out sight lines may sound more or less complicated, their actual working out can be practically accomplished in a very few minutes, and any one once having the sight line principle established in mind need have no fear of any problem which may arise involving its use.

The sight line layout as above explained and as illustrated in Fig. 1 applies only to the type of theater having a balcony and gallery, and the problem involved in the single division type as illustrated in the preceding article is confined exclusively to the sight lines for the people on the floor. Under such conditions it becomes almost identical with the problem for solving the curve of the orchestra floor of any type of theater, and it might be well to recall to mind the method adopted in laying out this factor.

The distance in elevation between the stage and the floor in front of the first row of seats is usually 3 feet. From this low point in the orchestra floor the level should be carried back approximately three rows. This distance, however, must be carefully considered in relation to the distance of the picture screen above the stage floor, the distance back from the curtain line, and whether or not there is an orchestra on the stage or in the pit. In each case, however, the sight lines back of the first three rows of seats would be solved in the same general way, and in case a picture screen is set back approximately 14 feet from the curtain line (which is the back face of the proscenium arch), and is elevated at least 3 feet above the floor, the conditions are such that the people in the second row can readily see the entire picture over the heads of the people in the first row even though the seats are on the same level.

Back of the first three rows of seats the floor continues in a rising curve which very closely approximates the curve of a parabola, the limiting rise of which is 1 foot in five. This limit is established by law and is maintained for all gradients leading toward an exit. In other words, no aisle or passageway leading toward an exit from the

theater should be built on an incline having a greater rise than 1 foot in 5 feet.

In laying out this curve, if the floor is to be laid on a true curve, the front point and the rear point having been established, it is customary to approximate the curve and then try out the sight lines rather than to attempt to accurately establish the curve by any formula.

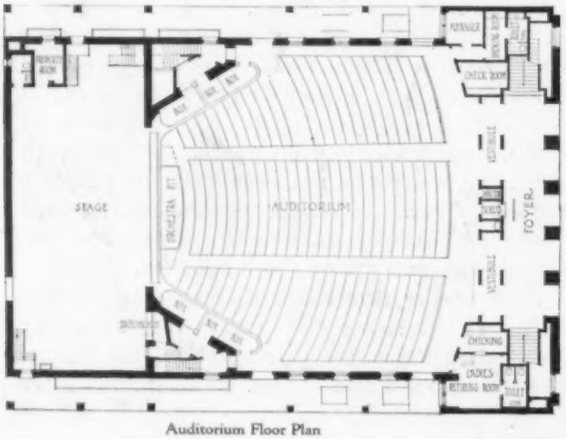
Many theaters have no curve whatever to the orchestra floor, the rise being accomplished by sections of flat floor construction at different pitches, each section being tangent to what would be the true curve in its respective portion of the orchestra floor.

Within a very few years the attempt was made to lay out a theater with what was called a dished floor, but this construction has now been obsolete for some time. The dished floor construction is that in which the seats are all arranged on concentric circles, but each circle instead of being level rises from the center to the outer edge. It is almost incomprehensible that any one should attempt in any practical work to lay out a floor of this character as it immediately makes the sight line problem of the extreme side seats far more difficult than before, and is the exact reverse of the correct and accepted layout for the seats in the balconies and galleries in which divisions of the house the outside or extreme seats are as a rule lower than the seats in the center.

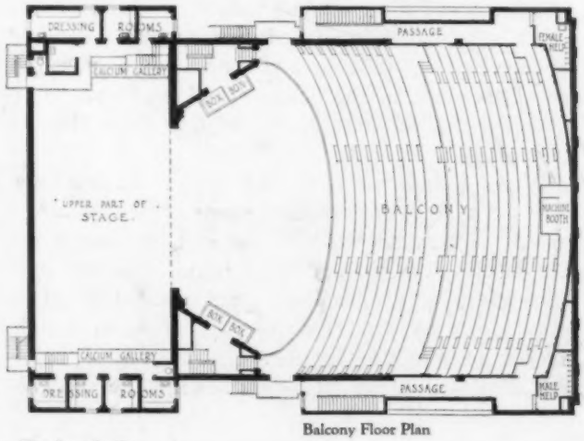
The orchestra floor should be constructed when seats are arranged on the concentric curve plan, so that each row of seats is exactly level all the way across the house. In the balcony and in the gallery, as has been mentioned above, this does not hold true, and the camber or drop of the seats from the center to the side is one of the problems which must be carefully worked out.

The reason for this is sufficiently simple, but the idea may not occur without a little explanation. Assume, for a moment, a person sitting in the rear row of seats at the extreme side next to the outside wall. Such a person in looking across toward the center of the stage or toward the extreme opposite side of the stage would have a vision line of a certain length and pitch, while in looking at the nearer side of the proscenium arch the difference in elevation between the observer's eye and the stage level is exactly the same as in the previous condition, but the pitch of the sight line is considerably greater. Consequently, in order to give the people on the side of the balcony or gallery a clear unobstructed view of the full opening of the proscenium arch at or below the stage floor level, it is necessary that all those seats immediately in front of him should be dropped at a little sharper angle than the drop of the seats on the main axis of the house. When this point has once been fully established in mind and has been carefully worked out, no further troubles need be anticipated except in extraordinary construction; but it is a fact that the sum of all the difficulties of sight line work in theater construction rests in this point and in the determination of the sight line for the extreme side seat in the rear of the orchestra floor. The rear row of seats in balcony or gallery is usually made level, and on the extreme side aisles the intervals or steppings between the front and rear rows of seats are equally spaced. This makes a gradually increasing height to the steppings as they progress from the center to the side. The legal limit to the height of these steppings is 21 inches, and where this extreme height is used two intermediate steps in the aisles must be provided.

With the advent of motion pictures a new problem in sight lines was immediately presented, the

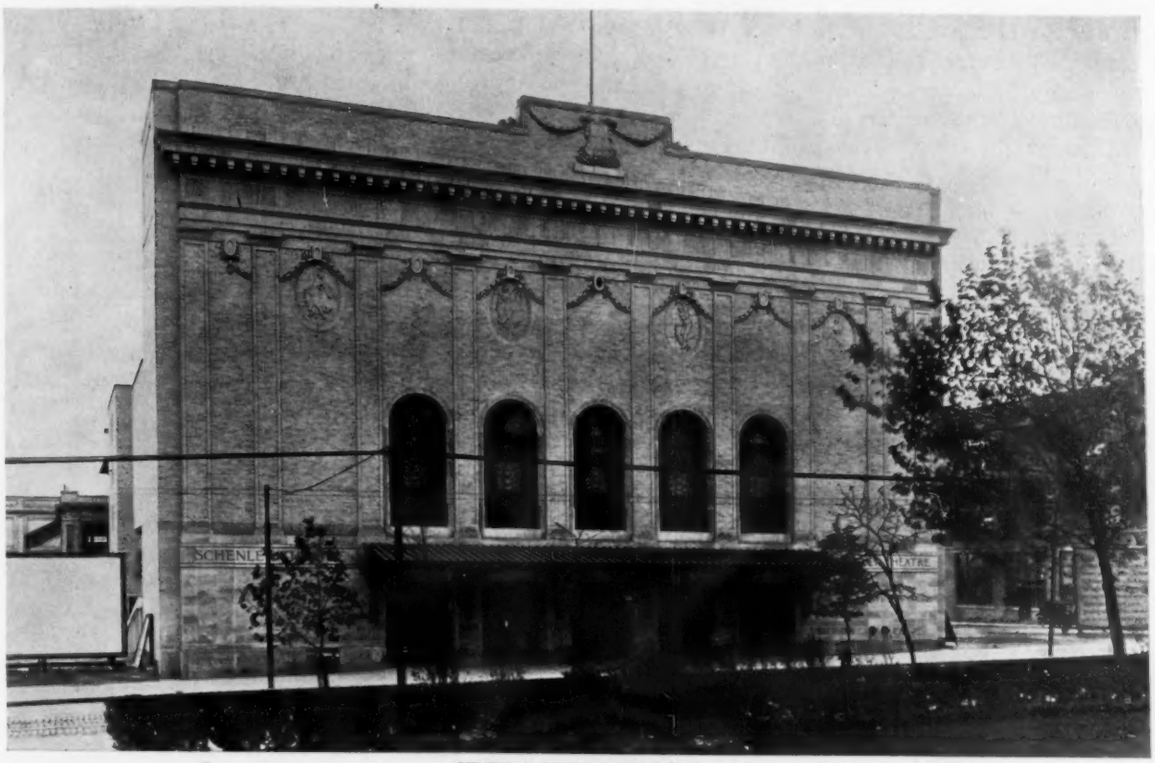


Auditorium Floor Plan



Balcony Floor Plan

Schenley Theater, Pittsburgh, Pa.



GENERAL VIEW OF FACADE

VIEW OF INTERIOR FROM THE STAGE

SCHENLEY THEATER, PITTSBURGH, PA.

H. E. KENNEDY CO., ARCHITECTS

light rays of the picture machines being a new factor. The arrangement of the picture booth so that these light rays will not interfere with the sight lines of the theater, and so that interference with the light rays on the part of the audience would be impossible, has made the problem a little more complex.

It is necessary, therefore, before finally establishing the location of the picture booth to project rays from the contemplated locations of the various machines and check up with the seating layout so as to ensure freedom from obstruction. Nothing is more annoying to the audience watching the picture than to see the top of some one's head moving in shadow across the screen or to see some mischievous member of the audience raising a hand to project a shadow on the screen, and it is obvious that if the picture booth be located in back of the last row of seats, the possibility of such obstructions must be carefully considered.

In Fig. 1 the rays have been shown projected from the picture booth in such a manner as to establish the condition where interference is impossible.

It will be well to give a few general rules as to the location of the apertures through which these light rays are to pass, but before discussing this feature it will also be well to consider the layout of the machinery in the booth.

This layout as used in the better class of houses includes three machines — two for picture projection and one for stereopticon, or "stills." The machines are so linked together that the shutters of each may be operated from one lever so that in running a multiple reel feature the transition from one machine to another may be made instantaneously and with practically no break in the continuity of the picture. The only adjustment required is the natural focus of two machines on the same picture screen. Each of the picture machines except the stereopticon has a single aperture through the wall for the light rays and an additional observation hole for the operator to use in watching the picture. The stereopticon, however, has two apertures, one for each lens, and these apertures are located at a different level from those of the picture machine.

The picture machine opening is usually 3 feet 6 inches from the floor to the center of the opening. The lower stereopticon opening is usually 3 feet from the floor, while the upper opening is 4 feet to 4 feet 6 inches above the floor.

In laying out the ray lines (Fig. 1) from the machine booth a line is drawn from the center of the projecting aperture to the top of the screen and another line from the center of aperture to the bottom of screen. This establishes the zone of light as the spread of rays is supposed to be controlled by the lens so as to just encompass the size of the picture screen.

The lower line corresponding to the lower ray of light is the one from which the interference on the part of the audience might be expected, and this point should be not less than 7 feet above the back row of seats and approximately 7 feet above the front row.

It is necessary, however, to consider that space saving in the cubical contents of the building requires the ceiling to be maintained at as low a level as possible, but not to the extent of causing obstruction with the upper ray of light on the part of cornice members, beams, etc. For this reason the apertures in the booth should be carefully located and the ray lines drawn to the screen before the ceiling construction is definitely established. Care should also be taken that cornices, etc., do not reach to such a point as to cause an uncomfortable reflection from the ray of light that might annoy the audience.

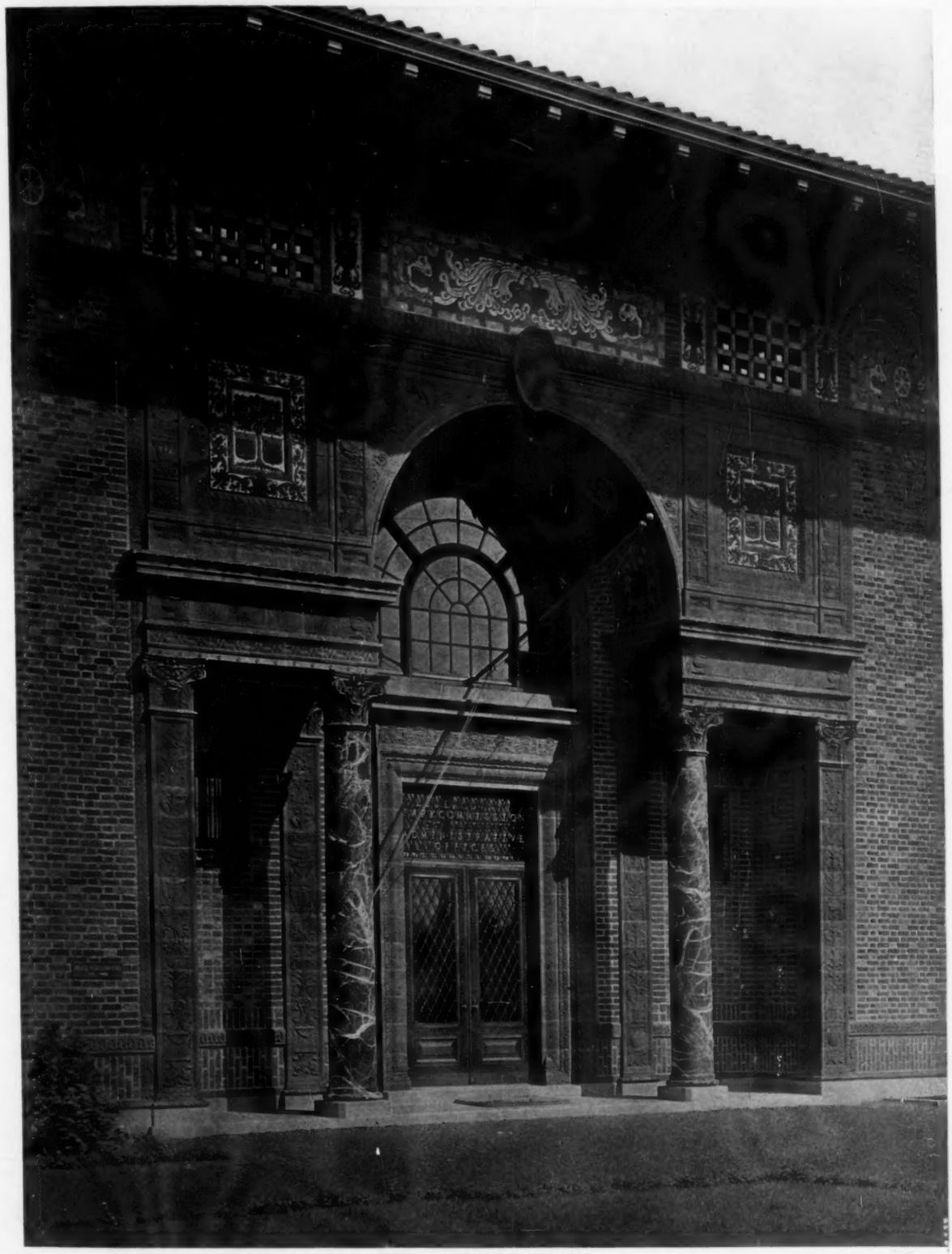
The essential features in sight line layout have here been considered and while there are numerous other problems involved in the proper layout of the theater to ensure high range of visibility for all of the patrons, the same considerations apply to the different seats in the house as have here been noted.

The whole problem is a simple matter of projection after the fundamentals have been understood.

Reference to Fig. 1 and Fig. 2, in which the sight line from seat A has been worked out through the intersection of the point B to the screen, gives the essential method of working out every seat likely to have an obstruction in its range of vision, and by taking various sight lines from the same seat at different intervals along the curtain line the exact outline of the obstruction can be plotted.

Where boxes are used in connection with the theater layout, it is quite essential that the sight lines through various points on the soffit of the boxes should be worked out, as frequently by a slight elevation or a slight decrease in projection the obstruction may be entirely cleared from the picture.

The whole problem, then, is one of projection and trial and adjustment, and after it has once been successfully solved, there will be no further terrors for any one who has formally approached it with some trepidation.

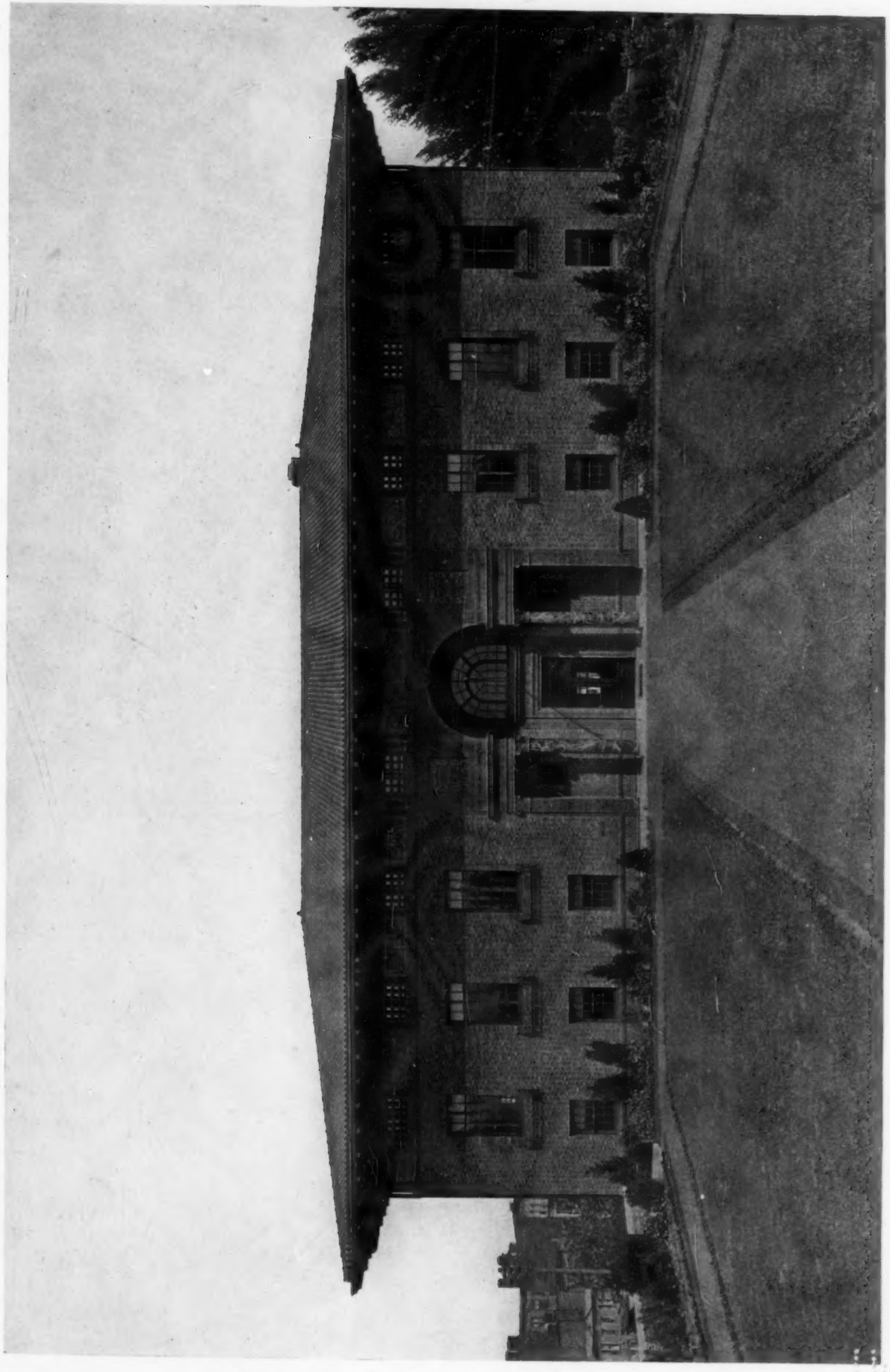


DETAIL OF MAIN ENTRANCE

ADMINISTRATION BUILDING, ESSEX COUNTY PARK COMMISSION, NEWARK, N. J.

H. VAN BUREN MAGONIGLE, ARCHITECT

This rule shows the extreme size of the plate illustrations in former editions of The Architectural Forum

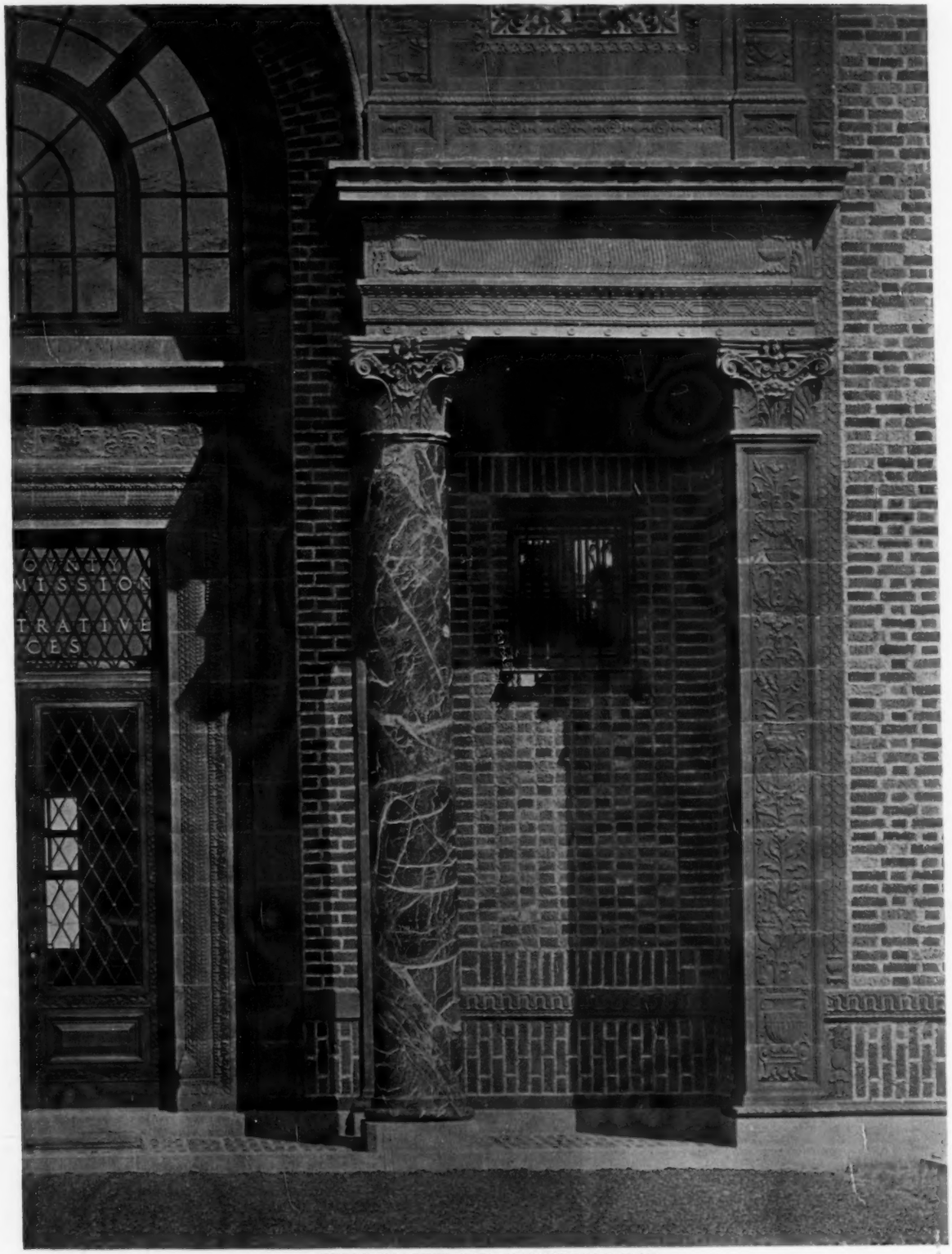


ADMINISTRATION BUILDING, ESSEX COUNTY PARK COMMISSION, NEWARK, N. J.
H. VAN BUREN MAGONIGLE, ARCHITECT

DETAIL OF PRINCIPAL ELEVATION FROM LOWER LEVEL

ADMINISTRATION BUILDING, ESSEX COUNTY PARK COMMISSION, NEWARK, N. J.

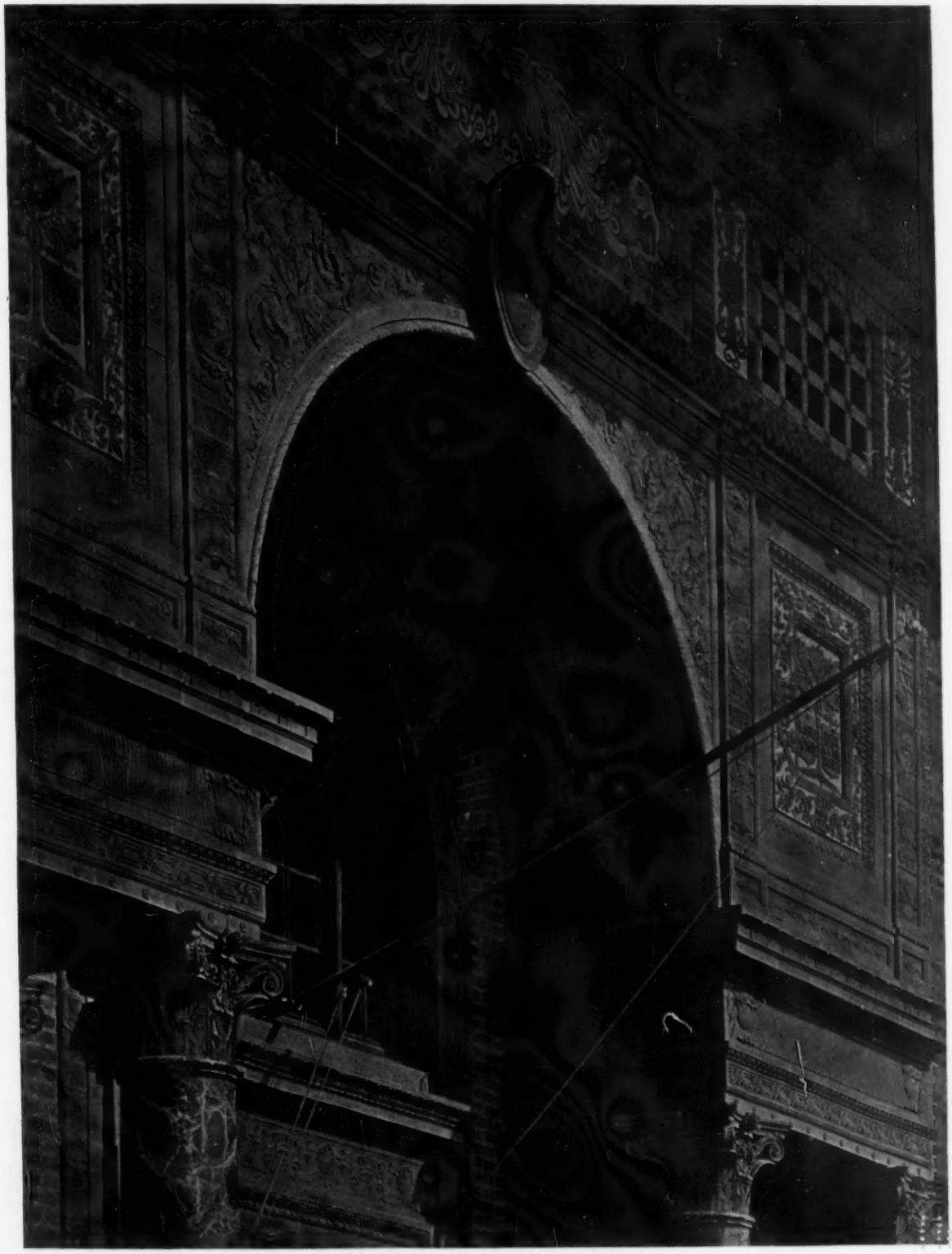
H. VAN BUREN MAGONIGLE, ARCHITECT



DETAIL OF LOWER PART OF MAIN ENTRANCE

ADMINISTRATION BUILDING, ESSEX COUNTY PARK COMMISSION, NEWARK, N. J.

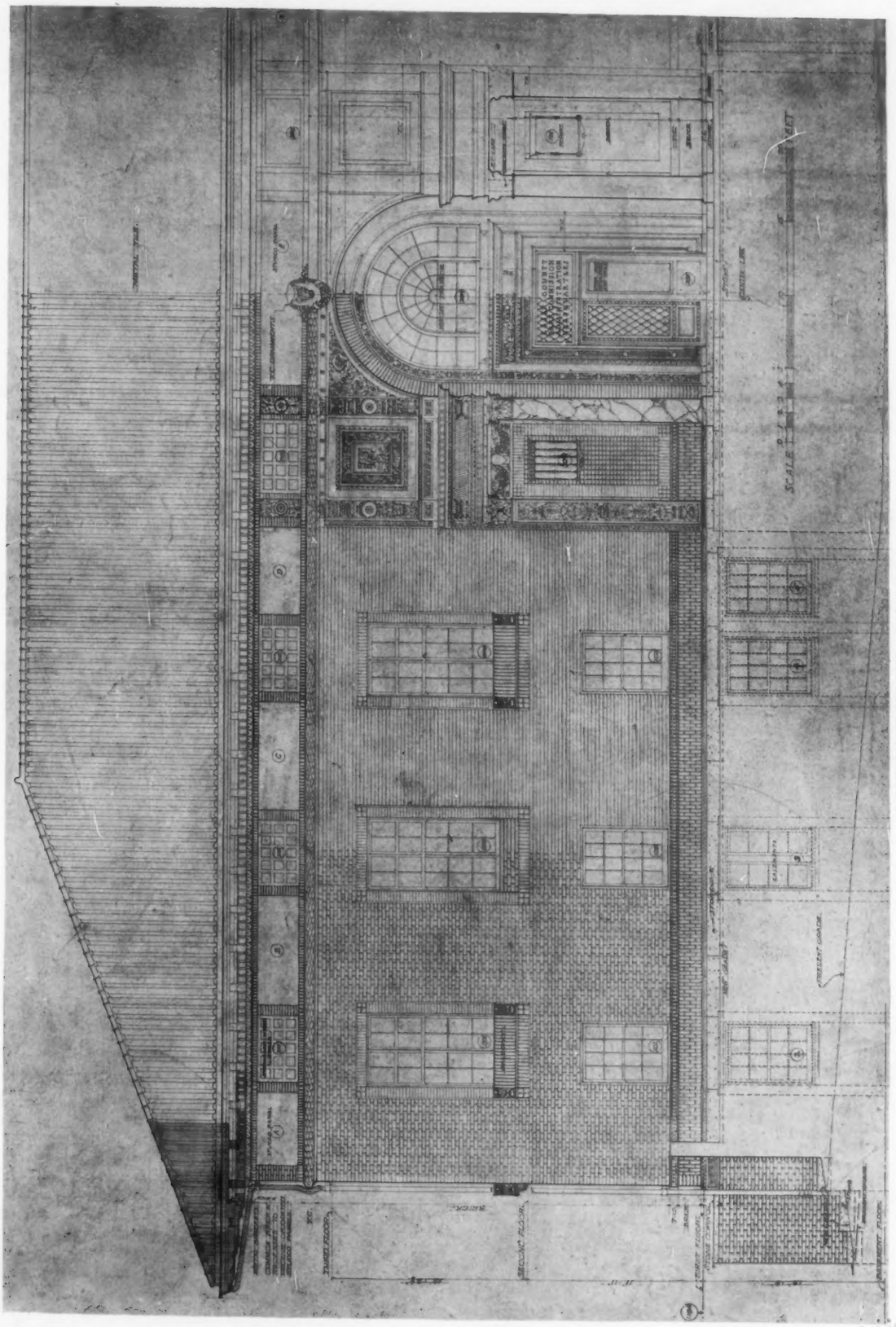
H. VAN BUREN MAGONIGLE, ARCHITECT



DETAIL OF UPPER PART OF MAIN ENTRANCE

ADMINISTRATION BUILDING, ESSEX COUNTY PARK COMMISSION, NEWARK, N. J.

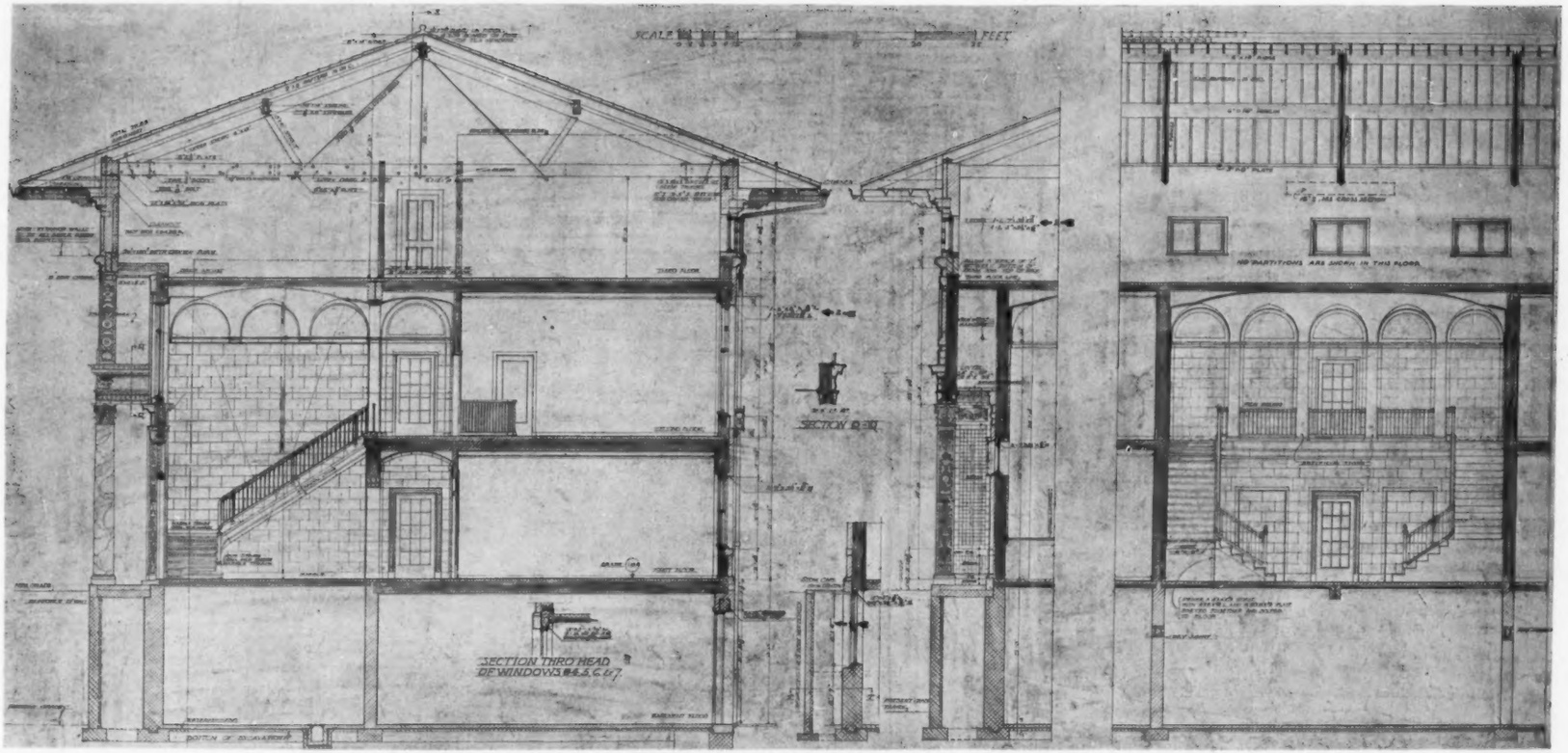
H. VAN BUREN MAGONIGLE, ARCHITECT



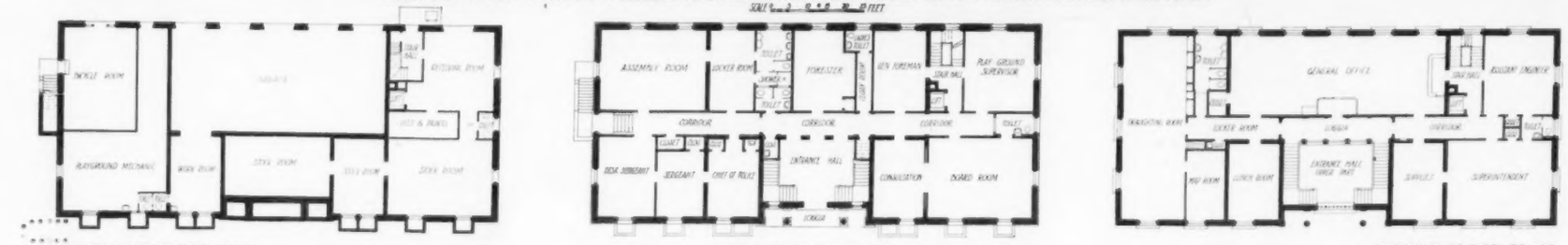
PORTION OF PRINCIPAL ELEVATION

ADMINISTRATION BUILDING, ESSEX COUNTY PARK COMMISSION, NEWARK, N. J.

H. VAN BUREN MAGONIGLE, ARCHITECT



CROSS SECTION THROUGH BUILDING AND LONGITUDINAL SECTION THROUGH ENTRANCE HALL



BASEMENT FLOOR PLAN

FIRST FLOOR PLAN

SECOND FLOOR PLAN

ADMINISTRATION BUILDING, ESSEX COUNTY PARK COMMISSION, NEWARK, N. J.

H. VAN BUREN MAGONIGLE, ARCHITECT

STAIRWAY AND ENTRANCE HALL

SECOND FLOOR CORRIDOR

ADMINISTRATION BUILDING, ESSEX COUNTY PARK COMMISSION, NEWARK, N. J.

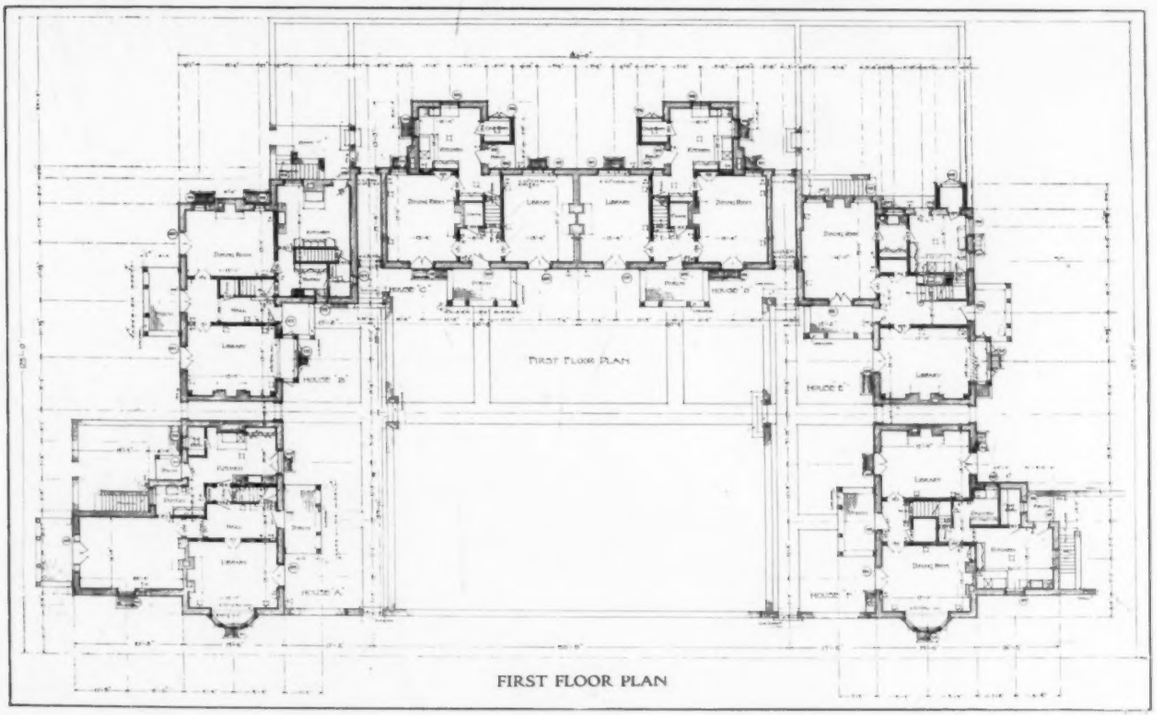
H. VAN BUREN MAGONIGLE, ARCHITECT

VIEW LOOKING ACROSS FRONT COURT

LINDEN COURT, ST. MARTINS, PHILADELPHIA, PA.

EDMUND B. GILCHRIST, ARCHITECT

VIEW LOOKING TOWARD LEFT FROM WILLOW GROVE AVENUE

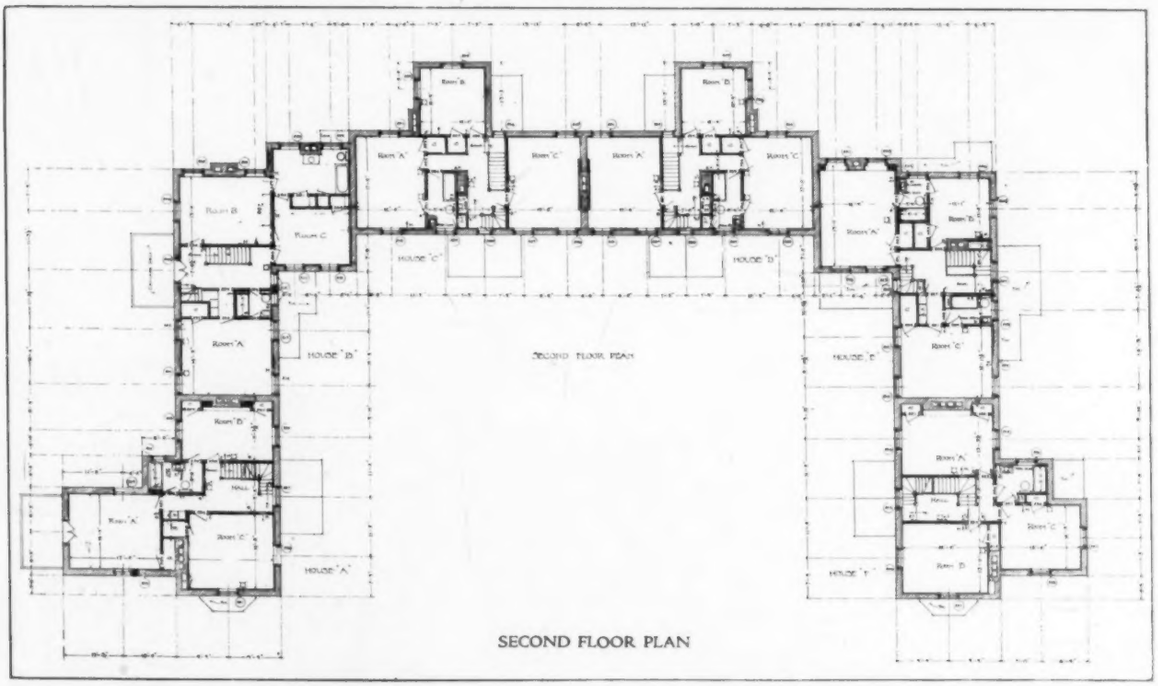


FIRST FLOOR PLAN

LINDEN COURT, ST. MARTINS, PHILADELPHIA, PA.

EDMUND B. GILCHRIST, ARCHITECT

VIEW LOOKING TOWARD RIGHT FROM WILLOW GROVE AVENUE



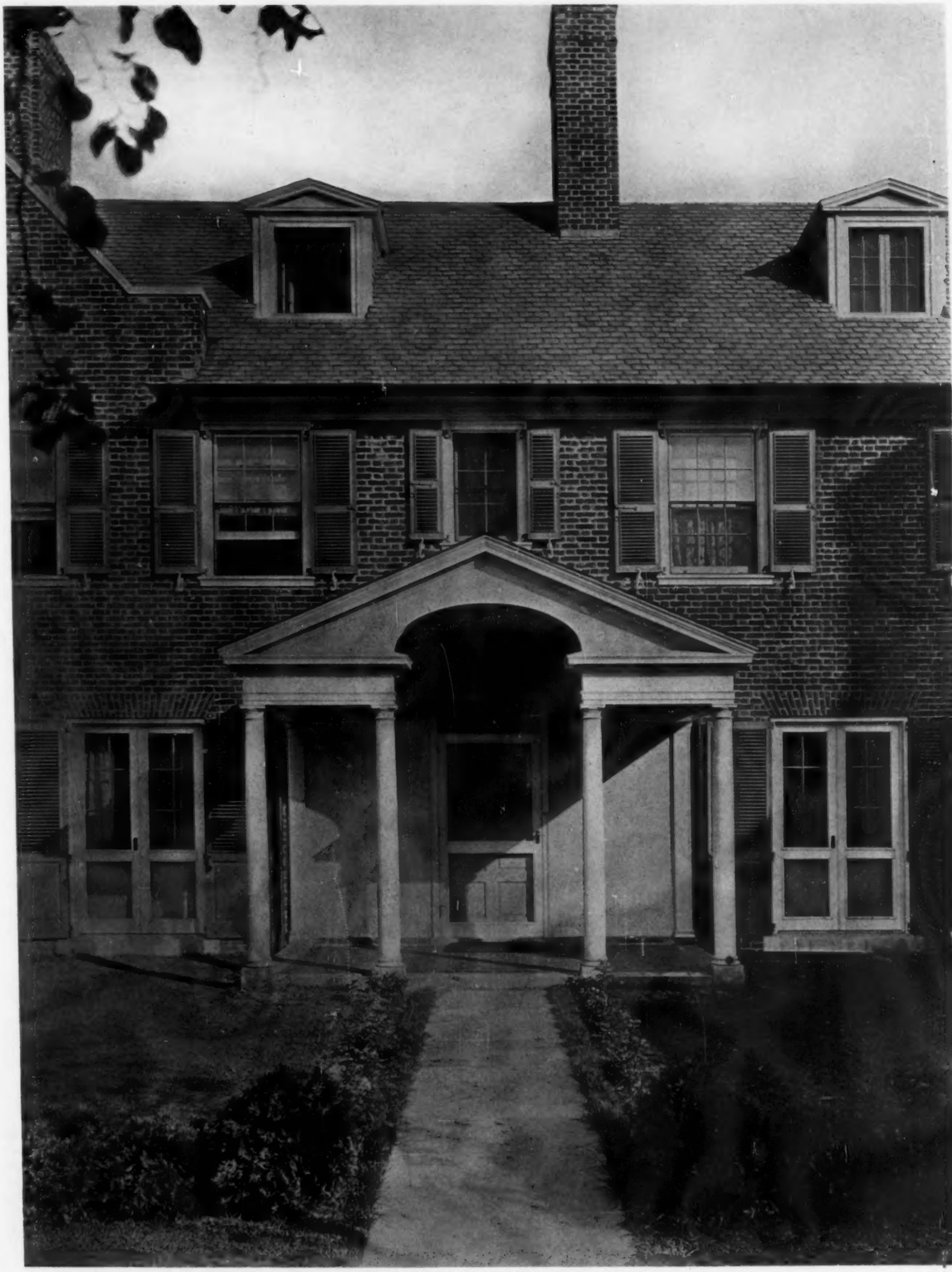
SECOND FLOOR PLAN

LINDEN COURT, ST. MARTINS, PHILADELPHIA, PA.

EDMUND B. GILCHRIST, ARCHITECT

LINDEN COURT, ST. MARTINS, PHILADELPHIA, PA.

EDMUND B. GILCHRIST, ARCHITECT



DETAIL OF HOUSE AT LEFT CENTER

LINDEN COURT, ST. MARTINS, PHILADELPHIA, PA.

EDMUND B. GILCHRIST, ARCHITECT

VIEW FROM REAR SHOWING GARDEN TREATMENT

VIEW LOOKING ACROSS COURT FROM LOWER LEVEL

LINDEN COURT, ST. MARTINS, PHILADELPHIA, PA.

EDMUND B. GILCHRIST, ARCHITECT

VIEW OF A REAR COURT AND GATE

DETAIL OF ENTRANCE AND BAY WINDOW

LINDEN COURT, ST. MARTINS, PHILADELPHIA, PA.

EDMUND B. GILCHRIST, ARCHITECT

DINING ROOM

LIBRARY LOOKING TOWARD BAY WINDOW

LIBRARY LOOKING OUT TO GARDEN

INTERIORS OF ARCHITECT'S OWN HOUSE

LINDEN COURT, ST. MARTINS, PHILADELPHIA, PA.

EDMUND B. GILCHRIST, ARCHITECT

Linden Court, St. Martins, Philadelphia, Pa.

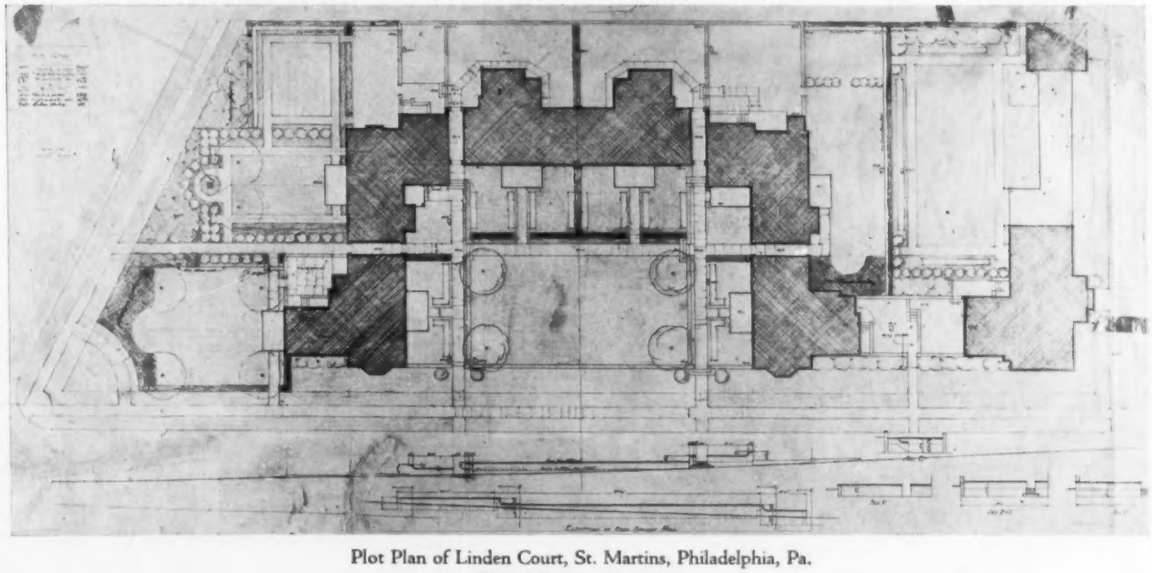
EDMUND B. GILCHRIST, ARCHITECT

By HAROLD DONALDSON EBERLEIN

A PRACTICAL example of judicious planning, reasonably rewarded by profitable rentals from satisfied and permanent tenants, is the group of brick dwellings at St. Martins, Chestnut Hill, Philadelphia, illustrated in the preceding plates. In examining this unit in the development of a residential tract, known as St. Martins Green, the clearest conception of its full and exact significance will be gained first by noting the purpose of the general scheme of which it is an integral and important part, next by surveying its execution in detail, and, finally, by pointing out its thoroughly practical value as a precedent suitable for emulation and adaptation in dealing with further solutions of the vexed question of suburban or semi-suburban domestic building.

St. Martins Green is the happy solution of a double headed problem — the meeting of housing needs, through speculative building for tenancy, worked out in conjunction with a coherent program of city planning. Because of the seething agitation over housing conditions in tenement districts and industrial settlements, we sometimes fail to realize that there is a housing need in our cities for people of moderate or comfortable circumstances, and that it is a very real problem more and more insistently crying out for solution. The accomplished work about St. Martins Green proves that housing of this character may be satisfactorily and profitably provided by so-called speculative building under the right direction, and that the process is perfectly compatible both with legitimate architectural ideals and with sane neighborhood planning aims. Thanks to one controlling and directing influence, in the person of the owner, it was possible to make proper allowance for the lie of the land in planning for conveniently arranged groups of houses, each group a consistent and complete unit within itself, and all the groups bearing sufficient relation to each other to ensure harmony in the whole composition. Three architects — Messrs. Edmund B. Gilchrist, H. L. Duhring, Jr., of Duhring, Okie & Ziegler, and Robert Rodes McGoodwin — were invited to collaborate in preparing a plan for the green and for the grouping of the houses to be erected on the adjacent land. The several groups were distributed among the three architects, and amicable collaboration with sufficient latitude for each to work out the expression of his individual conceptions in his own groups produced as much unity as was desirable in the whole undertaking.

Linden Court, the brick group with which we are here particularly concerned, occupies a plot of ground, facing south on Willow Grove avenue, 225 feet long by 125 feet deep, the land sloping



Plot Plan of Linden Court, St. Martins, Philadelphia, Pa.
Edmund B. Gilchrist, Architect

The house shown at the extreme right, while not essentially a component part of the group, was designed and so located as to be a connecting link between the group and the neighboring houses.

Porch at Rear of Architect's Own House

slightly to the southwest. Had the owner wished to do the ordinary, conventional thing, it would have been possible to build thereon two groups of twin houses, allowing for each a lot 56¼ feet wide by 125 feet deep, or, if five houses had been squeezed in, each could have had 41 feet front. In any event, there could have been no particular individuality in the scheme, there would inevitably have been certain undesirable features, and a portion of the ground at the rear would have been incapable of fulfilling its largest usefulness. The cost of construction would have been quite as much and probably more than the cost of the sextuple grouping around three sides of a quadrangle. The plan adopted, however, besides possessing the merits of individuality and architectural charm, along with manifold other points of commendation, makes the most economical use of the ground by providing for *six* houses, instead of four or five, by utilizing the full *depth* as well as the full width, and by giving all the dwellings the common advantage of what would otherwise have been an unattractive expanse of back lots. The cost of construction for the group was 22 cents per cubic foot, including plumbing and heating.

The plans and illustrations will, in the main, tell their own story, but some supplementary explanations and discussion are also necessary. The sand faced bricks of the walls, laid in Flemish bond, were not selected for color, but followed the ordinary run of the kiln with such variation as chance gave. The trims are of buff Indiana limestone. For the exterior woodwork, cypress was used, painted white with the exception of the shutters, which are a dull and moderately light green. Soft yellow poplar was used for all the interior woodwork and painted white. The flooring for all the porches is of smooth red 6 by 9 deck roof tiles laid with wide cement joints. Beneath the porches the house walls are smooth stucco, whitened, and the texture here, as everywhere else both outside and in, has been kept smooth, as roughness reduces apparent size. The roofs are of gray slate.

An inspection of the plans will show that the houses differ with the exception of the two middle ones on the long side facing south, which are virtually the same in their interior arrangements. This was done because the problem of orientation in each case required a different solution; incidentally greater individuality for each house followed as a result. The arrangement of the houses about three sides of a quadrangle assures the maximum of light and agreeable exposure to each house and to every room in each house. There is scarcely a room in the whole group that has not two exposures. One admirable feature, so far as abundant light and ventilation are concerned, is that the houses are not deep, but spread out with long fronts.

Although the group has been pushed back as far as the depth of the plot would allow, so as to leave all the space possible for the individual gardens and the common grass plot in the quadrangle, enough room for all utilitarian purposes has been left in the kitchen yards where the brick enclosing walls are high enough for privacy, but not too high for ventilation and clothes-drying.

In design, the back of the group displays little less architectural charm than the front, and Mr. Gilchrist has treated several features in such a way that they agreeably remind one partly of Queen Anne's Gate or Grosvenor Road, partly of Mr. Lutyens' facile touch. Again, quite unlike any reminiscences from any of these stimulating

sources of inspiration, we find refreshing bits like the latticed, double decked porch on the garden front of the architect's own house. The general Queen Anne, Early Georgian aspect of the whole composition has a peculiarly appropriate local association, for Philadelphia is steeped in Georgian tradition. And yet there is nothing about the Linden Court houses, either inside or outside, to suggest pedantic reproduction. Indeed, on the contrary, there is noticeable the utmost freedom in the handling and adaptation of precedents drawn from various sources, and all of them are compacted into a perfectly congruous whole. To give but one or two instances, nearly all the doors in the interiors are paneled after an old French manner with one large panel below and another large panel above, and the two separated by a lock rail. The mouldings, however, are English rather than French. Again, the shutters are Georgian in dimensions, but the heavy, fixed slatting, obviating all unpleasant rattling, is Italian in type, and, it will be noted, is held in place by chunky cock moulds.

The houses, to be sure, are small, but everything possible has been ingeniously done to allay the sense of smallness by restraining the scale of all details. The work has been done in a subtle way and is thoroughly effective. Instead of detailing the door and window trims, the door panels and other similar items in a scale one would customarily employ in a room of ordinary dimensions, the proportions have all been pared down and attenuated to lines of rather unusual refinement. The result is agreeable and there is a perceptible gain in apparent size. In this connection, it is worth noting that door and window frames are set in flush with the surface of the wall and display only the slightest projection of moulding beyond the wall surface. Still further, the fenestration has been so disposed that there are enough unbroken wall spaces to assist the sense of roominess and incidentally to facilitate the operation of furnishing. By judicious planning and the employment of these subtle aids, the interiors have been endowed with an atmosphere that creates the impression of size.

One of the most commendable features of the plan, one that assures a maximum of privacy and one, doubtless, that has appealed with unusual force to the occupants, is the complete freedom and independence of outlook of each of the houses. Another factor that contributes to the sense of privacy is the position of the [houses on three different levels; the variations in grade along with low brick retaining walls give enough separateness to prevent the too intimate contiguity of a Pomander Walk. The occupants of Linden Court are not forced by circumstances into one another's company, and, if they wish, they can live to themselves quite as well as though they were in an apartment house. One architect, in fact, when he first saw Linden Court, described it as an apartment house spread out over the ground instead of built up in the air.

The single house shown on the plot plan and connected with its garage by a pergola and

Detail of Lattice Porch

garden wall, at the corner of Willow Grove avenue and Crefeldt street, while not a component part of the group was designed in harmony with it. Being partly of brick and partly of stucco, it serves as a connecting link between the Linden Court group and the stucco houses opposite on the far side of Crefeldt street.

For obvious reasons it is not permissible to state the rents, but it is permissible to say that they are of an amount to make the court a paying investment, and that they are somewhat higher than the rents of houses of larger size built in rows, in true speculative builder style, not very far distant. The wisdom of the whole policy of building houses of real architectural worth for renting purposes has been tested and proved by ample experience in the vicinity of St. Martins, and the same condition would probably be found to obtain elsewhere equally as well.

View Looking through Alley Across Front Court

In the case of Linden Court, it was a happy stroke to put six houses, each producing a good rental, where under conventional conditions only four, or, at the most, five houses could have been placed. Over and above that it is an achievement worthy of emulation to create a group in which every feature of the site and of the buildings is made to count for its utmost practical and artistic value; a group whose each unit has individuality and privacy; a group whose occupants, whether they analyze their feelings or not, are evidently responsive to the architectural appeal to their imagination. Linden Court is veritably an exemplification of the truth that beauty pays, and that there is no legitimate reason for the desolation of the usual speculative domestic buildings.

View of Linden Court from the Rear

Edmund B. Gilchrist, Architect

The Problem of the General Contractor

By WILFRED W. BEACH

IN the previous paper the author discussed the relations of the architect to the contracting system and the evils which have come about in its practice to-day that seriously affect the profession of architecture. In this article he considers the encroachment on the architects' legitimate field by the cost-plus contractor, which adds another phase to the serious problem confronting architects. — Editors.

IF A contractor, fully equipped to serve his clients to their best advantage, has built up for himself a reputation for fair dealing and finds that he can get work from them at first hand, why should he trouble himself to hold up the hands of architects none too friendly? Why should he submit himself to the insulting inferences of the general contract form and bond? Following the line of least resistance, is it not much simpler for him to dub his head-draftsman "architect" and proceed accordingly? And is this not made especially easy by reason of the fact that at least half the practitioners of the profession, unbridled by law or public standards, are unworthy the appellation to which they lay claim?

What is an architect but a creator of structures? Is this head-draftsman any less an architect because his remuneration touches first the hand of the contractor after it leaves the owner? The report of the Institute Committee on the relation of architects to the contracting system, cited in the previous paper, advises us that the "biggest" architects in the country are often employed and directed by the contractors to whom they are supposed to dictate. How are the mighty fallen!

What next?

The builder of high class and good repute, who thus departs from the bellicose career of the competitive-bidding contractor and embarks on the safe and sane policy of cost-plus building, must first add to his reputation the attribute of thoroughgoing responsibility. He has then gained one very considerable point if he proposes to compete with architects to their elimination, *i.e.*, he can convince his prospective clients that his estimates are dependable, can guarantee them in fact, and can advertise that he does so.

Fortunately for the architectural profession, as the practice is still most generally conducted, the majority of the builders who have thus far elected to try cost-plus advertising have not been of the dependable kind and the public is still wary of them — not forgetting that for decades the contractor, in many opinions, has been the very culprit upon whom the architect has been paid to spy.

Strange concerns, "outsiders," may thus be viewed with suspicion; but if the owner has a friend, a tried and proven builder, who refuses to accept work under the Uniform Contract — will not submit to the decisions — questionable from the contractor's point of view — of a judge whose verdicts are paid for by the owner, then will the latter give up his favorite builder in preference for his less favored architect? Probably not, especially if the contractor is a good business getter and can demonstrate that his architectural department is as good as that of his competitor. All this we have seen explained. Who can say whither it trends?

The head of one of the largest, if not *the* largest, contracting concerns in the country, himself a financier rather than a builder, refuses to see any cause for alarm so far as architects are concerned. He insists that his concern adheres strictly to its own province and asserts that the friendship of architects is of great importance.

Another such head, no less prominent, recognizes the increasing predominance of his own drafting room and admits that, on simple structures, incidental to general engineering construction, they find it unnecessary to call in an architect, though quite willing to do so, if the client prefers.

Another frankly admits that, although on friendly terms with many architects, he does not hesitate to offer the services of his own, if by so doing he can land a job before it gets out of reach in an office where it will go to competitive bidding.

Still another freely admits that his firm is at war with all architects, and secures what work it can by belittling them and exaggerating their shortcomings.

These are the attitudes of the "big fellows." Diligent interrogation will develop the fact that they are typical all along the line. It is easy to draw any kind of a conclusion according as one's own opinions are backed up by the methods of practice of any of these builders.

Now it is quite possible to conceive that the "architect" in such an organization, if a man of well rounded ability, might work up into the management and control of the machine. The fact that such manager has generally been a practical builder or a clever financier argues not against it. When such a thing shall come about, what will be the status of that architect?

When is an architect not an architect? When he becomes a constructionist? Why should that be? What makes it so?

Evidently naught but the dictates of a code of ethics.

But is it not possible that a revision of such an ethical code may reveal to us the "constructing architect" and the "consulting architect" where we have now only the latter? The engineering profession accepts this classification, then goes farther and carries its operations well into the field of architecture proper, competing with both architects and contractors.

If the builder is to usurp the functions of the architect, why should not the architect reciprocate and carry his work into the field? He can and does, but not to the extent that he should. He does it either by a reversion to the separate contract method or by himself becoming the cost-plus builder. He can do either without violating his stringent code of ethics, though that code cripples him in the solicitation of business in competition with builders not so hampered. But he must realize fully the added expense to himself of carrying on such work by either method. It is such service for which the general contractor exacts his 5 to 15 per cent. And for this purpose the general contractor is supposed to possess an organization and equipment capable of tying together the work of the various independent trades. The architect has no such organization or equipment and finds difficulty in persuading the owner that they are not needed, or that the architect is entitled to an added commission if he undertakes to provide same, or for looking after more numerous separate contracts. Some architects have met this difficulty by taking bids on both general and separate contracts and proving that the combination of separate figures foots up less than the general contractor's total — as it should, by the difference in the amount of his profit. The architect should also be able to give the owner lower bids from branch contractors. Not that such bidders will deliberately figure lower for him, but that the general contractor does not ordinarily get many sub-bids in each line *before* the job is let. He neither has time nor blueprints enough. After the letting, he takes time and is often not too scrupulous about playing one bidder off against another in a manner he would not for a moment tolerate in connection with his own bidding. The owner gains no advantage from this.

A certain material man states that he makes it a point not to give a general contractor his lowest price before the letting, as it would only be used for a guide by which his competitors could adjust their figures. To what extent such practice is indulged would be difficult to guess, but it is a notorious fact, as mentioned by the A. I. A. Committee, that many general contractors operate entirely on the capital of the supply houses with which they deal and that they are perforce compelled to give such concerns preference in buying. The architect can be supposed to be free from such bias and can let his contracts without favor, with every advantage to the owner.

But while it may or may not be essential that the architect furnish this field service at a lower price than can be done by the general contractor, nevertheless the former must, if he undertake it, do it as well or better. This would seem to mean that he must be prepared to furnish the miscellaneous equipment and backbone of the building organization, now supposed to be in the true province of the general contractor.

In doing this the architect becomes at once a cost-plus constructionist exactly as a contractor so operating. For cost-plus service is no more or less than the day-work of aforetime, dignified and extended.

In spite of the fact that the typical owner is proverbially squeamish and suspicious when embarking on a building venture — has been so for ages — yet in all ages there have been men with sufficient confidence in their chief artisans to permit them to carry on their work without previously fixing a price. Such day-work building was supposed to bring better results to the owner because the contractor could have no object in skimping the job. If rigid economy was not an essence of the operation, the main objection thereto was eliminated.

The ordinary method of charging for such work was for the contractor to exact an advance of ten cents an hour on each man's time over the price actually paid him, the owner also reimbursing for all material as billed. It was assumed that the builder enjoyed a profit on the latter, though it cannot be said that any particular percentage was customary. The arrangement was based solely on the belief of the owner that the contractor would treat him right. Naturally it was often productive of misunderstandings, disagreements, and lawsuits.

This manner of building was chiefly confined to residences, alterations, and such minor construction. When architectural service was employed incidental thereto, the architect rarely attempted to audit accounts; it was not required. In fact, he was seldom urged to superintend the work.

Naturally, in a method which gave him little authority over the builder and which brought but part pay for part service, the architect had small enthusiasm. Then too, without a schedule of costs in his file, the architect was at the mercy of the owner in determining the amount on which the fee should be reckoned.

Of course, as in cost-plus building, the owner had no guaranty as to how much the work would cost nor when it would be completed. It is alleged that mechanics and their foremen work appreciably more slowly without the stimulus of an exacting contract, hence that the expense is also appreciably greater.

The evolution of day-work building into cost-plus construction is quite modern, though, as we have seen, the latter is merely a rendering of the former into more businesslike shape. The same basic principle is at the bottom of both plans and is the direct antithesis of the fundamental of competitive bidding contracting. The present general contract form presupposes the dishonesty of the contractor, and guards or seeks to guard against it. Cost-plus agreements carry the presumption that the builder is honest, as well as capable, and entitled to the confidence of his employer. In fact, in this sort of building construction the contract is merely a memorandum of the understanding existing between the parties thereto. It is quite impossible to write an iron-bound contract for any cost-plus arrangement. No scheme of supervision can be evolved to cope with it if the contractor wishes to swindle. The interjection of a third party solely for the purpose of "keeping the contractor honest" is superfluous. It can't be done any more than that the best of detectives can safeguard the honesty of any purchasing agent. An attempt to do so would necessitate parallel auditing—a considerable expense and quite useless because not sufficient for the purpose. It would make the builder more *careful;* that is all.

Under a lump-sum contract, with a guaranty bond, the superintendent has to see that the contractor builds according to drawings and specifications, has to pass upon the merits of material and workmanship, explain uncertainties, keep the work of different contracts dovetailed, and see the owner secure from mechanics' liens.

Under a cost-plus agreement how are these duties multiplied? If an architect undertake to superintend such construction, he must do all the foregoing, and must besides see that the buying is right, that the laborers are properly paid and do not shirk, that there is no waste or "shrinkage" of material, that time and other accounts are properly kept, and that the payment of bills incurred in the work covers no concealed rebates.

Verily, a Herculean task!

Probably the only reason that an architect would wish to supervise such construction would be to see that the spirit of his creation were not lost. But it is difficult to bring the lay mind to realize that all serious architectural work is truly creative, which is to say experimental and evolutionary, and that the designer must follow the execution of that work to its end in order to be sure that the solution of the problem is the best possible in every minute detail. Not appreciating this, few owners care to pay for such manner of supervision. They may be too prone to think it a good deal like asking pay for architect's mistakes, or their avoidance. An owner must be broad minded to get the architect's view-point.

Taken from all angles, there can be small room for wonderment that architects do not take kindly to cost-plus systems. Even though they recognize the theoretical justice of such a plan, they also realize how impracticable it is according to present-day methods.

Another reason why architects taboo cost-plus work as a general proposition is that few of the contractors with whom each has dealt have inspired these architects with sufficient confidence to warrant their unqualified indorsement as purchasing agents of labor and material in a truly altruistic spirit. The system in vogue produces too many of the other sort.

Yet the owner, having acquired the habit, under his modern business methods, of placing confidence in the individuals with whom he deals, *does* manifest a willingness to extend that confidence into his building deals, and the architect runs danger of being set aside if he object too vigorously.

Then again, the next step, the architect *is* once more set aside and this builder, in the arrogance engendered by the confidence thus placed in him, also usurps the functions of the architect, and cost-plus building likewise proceeds without him.

Thus, we see, in addition to the great contracting companies mentioned by the A. I. A. Committee and their smaller counterparts, a new growth of building companies organized with the intent of furnishing architectural service. These are not contractors, properly speaking, but "cost-plus constructionists."

Cost-plus construction varies in form, depending upon the outcome of the preliminary arrangement between owner and builder. While it is true that the acceptance of any such method is subtended by the confidence of the owner in the

constructionist, it does not inevitably follow that the latter merits that confidence. In fact, many of the mushroom concerns of this description that have recently come to the front appear to depend more upon their advertising and other propaganda for the getting of new business than upon the integrity of their performances. Seemingly the most able employees of such companies are their advance agents — their traveling salesmen.

Conferring with these individuals, it is discovered that they have no fixed price or scale of prices. It is their business to make the best deal possible, *but to make the deal.* It is with such a one as with the shyster architect, there is money in the job at any price. The abuses already grown into the system are so great that it is undoubtedly safer for an owner to turn his work over on a cost-plus basis to any responsible contractor of his acquaintance rather than to risk falling into the hands of the business procurer of the wrong sort.

The latter may submit any kind of a cost-plus plan for consideration. At first he will offer to take all the burden of the work off the owner's hands, pretending that he is thus going farther than architects do, and for this service exact a "modest honorarium" of anywhere from 10 to 20 per cent of the total cost of the work. He then proceeds to elucidate the advantages of his method, more especially as practised solely by his organization, making these sufficiently numerous to offset the loss of a lump-sum contract — of not knowing exactly what the structure is to cost.

"Our complete organization of experienced and efficient architects, engineers, and mechanics, and our superior advantages in purchasing, due to the enormous quantity of our buying, enable us to deliver your finished building at a much earlier date and a much lower cost than you could possibly accomplish by the old method. In addition to which we save you the 5 or 6 per cent you would have to pay a first-class architect. Our chief architect is as good as the best and his forces are mostly college graduates. Besides which, we have a first-class corps of engineers which your local architect has not.

"Moreover, we save you from being fleeced out of 50 to 100 per cent profit on your extras, which are inevitable under the old system. You know some contractors rely solely on their extras for the profit on the entire work. Others just make 'velvet' of it, but you save all that by our method. You can have all the extras you like and they go in at the same rate as the balance of the work."

"But I don't want *any* extras. My last building was done by a local architect with only fifteen dollars for extras, offset by fifty-odd dollars deductions. The contractor didn't get rich off that."

"No, perhaps not; but you see we have all these other advantages, including the considerable saving in rent by starting your construction immediately, without having to wait three or four months for your architect to prepare plans and get bids."

"Now," says Mr. Cautious Owner, with awakening interest, "you've hit the spot. I want to move into my building and rent the upper floors just as soon as possible — have half the space spoken for now. But I must know first how much it is to cost."

And they're off.

It does not occur to Mr. C.O. that hurried owners could always have started their construction coincidental with their planning, and would have more often done so, were it not for the superior advantages of having the drawings completed first.

In other ways Mr. C. O. is not too trustful — is somewhat wary, even though persuaded, largely on account of quantities of expensive literature concerning other work handled by this company, to employ the strangers. He wants to know just when his building will be completed, how much the gross cost will be, and just what is to be included in that cost. Furthermore, he suspects that the smooth emissary has not named the lowest fee for which his company will undertake the work. After further dickering, he finds this to be true and also learns that they are willing to have the amount fixed as a lump-sum. This they make 6 per cent of the estimated cost — they would have done it for 5, had he but known.

Next Mr. C. O. discovers that he is not really saving the cost of architectural service *in toto*, but that he is expected to pay for drafting, blueprinting, and typewriting as part of the work of contractor's forces. So he now insists that it be made plain as to what "overhead" and office expenses are to be charged against him.

These various points having been agreed upon, a time for completion set and an estimate of cost made, they proceed to the owner's lawyer to have a contract drawn. This worthy, not being thoroughly familiar with building construction, overlooks the fact that it is impossible to make a binding contract without having working drawings and specifications upon which to found it — and the further fact that the proposed agreement is one of mutual confidence in which the owner is bound to execute his part, whether the other party reciprocates or not.

The lawyer prepares a form and submits it. The owner insists that the maximum cost guess and the minimum time guess be made binding parts of the contract. To this the agent smilingly consents and offers not only to guarantee the cost, but to ask no commission on any overrun "except in case of considerable changes and construction not originally contemplated."

The contract is signed and the work begins.

Behold at once a "make-ready" more elaborate than anything heretofore seen in the locality. The owner consults his contract, the only guide he has, and finds nothing on the subject. He finds a considerable office force maintained in a large temporary office at the building, and discovers it to be a sort of headquarters for the preparation of sketches and the soliciting of work in that locality. But he cannot find whether or not he is paying for time so spent, though he knows he is furnishing free rent for the purpose.

He also finds "considerable changes and construction not originally contemplated" from the very beginning when $10,000 is demanded for piling not at first thought necessary. The building is carried to completion four months after the date set and at a cost considerably above the original estimate. The owner learns that his "contract" was no contract at all, except as it carried his own obligation to pay, which he does. Being a "good sport," he takes his medicine and keeps still, even when his demand for a statement that can be audited is met by the naive rejoinder of a "certified" accountant—in the employ of the builder—to the effect that, inasmuch as he discovered that the builder had not made his stipulated fee out of the work, no further statement is necessary.

And because Mr. Cautious Owner keeps still or has not done other building with which he can make comparison, the cost-plus plan of building is apparently growing in favor. This must be simply because it appeals to some business men as a fair and just way of undertaking a building venture. Not being thoroughly versed in building matters, they cannot realize how remote we still are from the ideal conditions upon which sound cost-plus construction must be founded. Even those concerns working under such system, which may be assumed to be absolutely honorable in their intent, find that intent circumscribed by two difficult entanglements. They may administer their business affairs in the most approved fashion. Their drafting room may be presided over by a man quite deserving of the title of "architect," and the designers and draftsmen under him may be as good as can be had. And they may thus offer formidable competition to the highest type practitioners whose ethical scruples forbid the too assiduous soliciting of business—business soliciting being ever the most highly developed department of the cost-plus builder.

But they have not yet been able to practise their own preachments and award sub-contracts on their structures in the same manner their own work was taken; nor have they been able to control the militant building trades union.

Now if it be probable, as some prophesy, that the cost-plus plan of building is to continue with a steady growth and eventually supplant the competitive system of contracting, it behooves the architect not only to determine his place in the scheme, but to do as the A. I. A. Committee suggested—begin to deal with the men who do the work.

Militant trades unionism has made longer strides in the building trades than in any others largely on account of the general contract system. In other lines the delegates of unions have dealt directly with their paymasters, thus encountering more resistance. In the case of the contractor, his output had no fixed price and he cared little what he paid his men, just so it was not in excess of what his competitors paid, and that no change in wages came on work already contracted for. The result was that union victories were easily won, and understandings easily effected whereby associations of contractors employed only union men, who in turn would only work for association employers. Such understandings, illegal though they be, are still in force in some of our large cities.

Whether we as individuals worry most over the high cost of champagne and grand opera seats, or are skimped to pay for gasoline and movie tickets, few of us are complaining because of the high wage of any one else. Why should we worry if the brick mason and plasterer draw more per week than the college graduate who so skilfully and sketchily crosses his corners on tracings the while he forgets to check the adjoining figures? If the latter preferred to do the work with a trowel, no doubt he could change his calling. Some have done it. Others should.

But where the architect and owner have just cause for complaint against the labor unions—and this strikes at the root of their present form of organization—is that the principle they labor the hardest to inculcate in their propaganda teaches the utter selfishness of their motive—the rendering of minimum service for maximum toll. So thoroughly is this principle rendered into practice

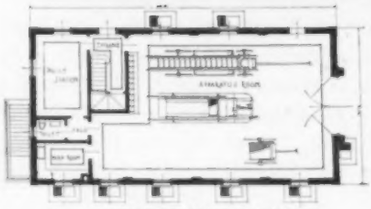
that the apprentice no longer exists in the building trades; he has almost disappeared from the shops.

Already we have a dearth of skilled men on our structures, competent testimony as to the efficiency of their methods. Everywhere architects complain of the low class work offered for acceptance and only in the largest cities is better to be had. And here is the problem that architects must squarely face, sooner or later.

The architects of the large cities are the last to experience this scarcity of good mechanics; hence, inasmuch as the government of the Institute and the shaping of its policies are in the hands of these architects, others must wait for them to act — but the problem must be faced. It must be met regardless of the problem of the general contractor, but must be dealt with more quickly if the other problem likewise becomes more urgent, because of its fundamental importance.

How is it to be met? There seems to be but one way — through the trade schools.

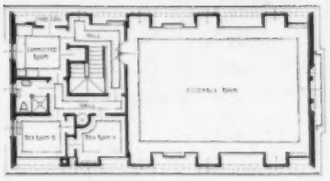
How architects or the Institute will work through these and larger schools of their kind to get an output that will eventually supplant and surpass the present mediocrity in the building trades, should have the attention of an Institute committee at the present time if the profession of architecture is a living thing, having as its aim the production of finished structures as fitting monuments to its genius. If, on the other hand, it be only a livelihood, or a fine art having its satisfaction in its drawings — if it be either of these, let it drift as at present, until supplanted by the more virile, if less ethical, process of the more enterprising builders. To lapse into the vernacular, "Where are we at?"



FIRST FLOOR PLAN

FIRE STATION, WESTVILLE
CONNECTICUT

BROWN & VON BEREN, ARCHITECTS



SECOND FLOOR PLAN

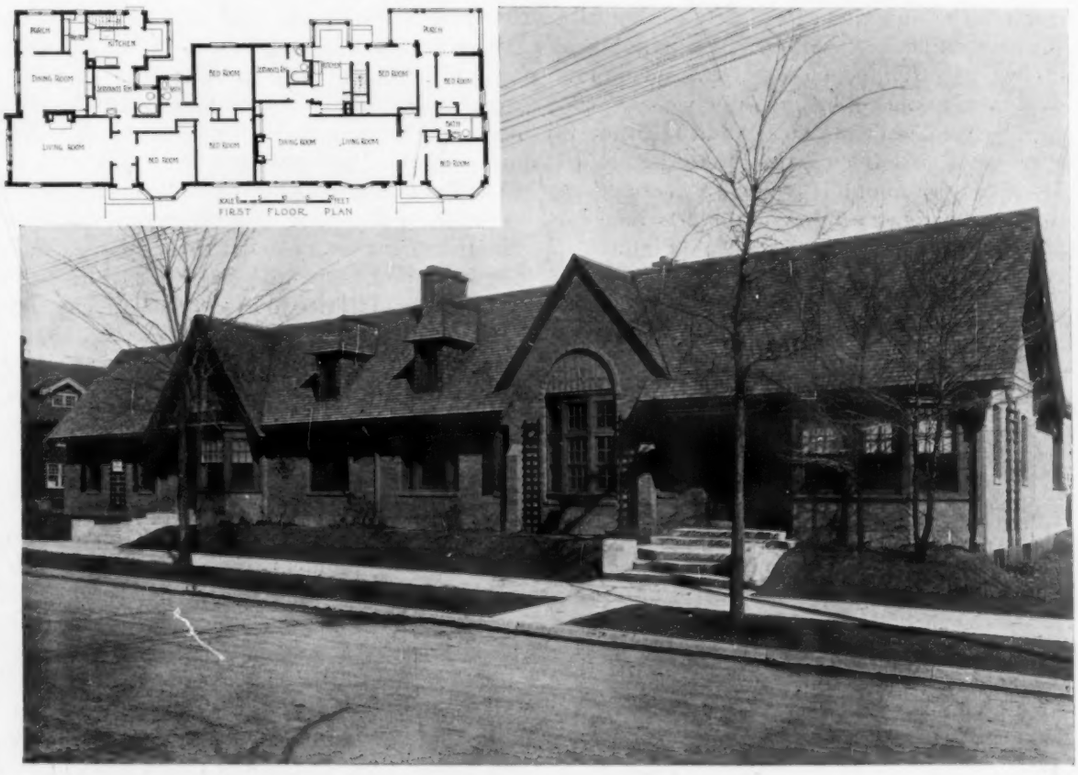
Administration Building of the Essex County Park Commission Newark, N. J.

ILLUSTRATED ON PLATES 1–8

THIS building, containing offices of the main executives of the Essex County Park Department, is located on a spur of Branch Brook Park at Sixth and Clifford avenues in the city of Newark. The site had a considerable grade from front to back, which permitted entrances to the building on two different levels. The basement garage, work shops, and storage are entered from the lower rear street level, while the main entrance to the first floor is on the upper level fronting on a garden forecourt and the park.

The building contains offices for the Superintendent of Parks and his various heads of departments, together with the associated clerical and drafting forces. It provides, in addition, headquarters for the Park Police and a suite of rooms for meetings of the Board of Commissioners for use when occasion demands.

The building in type is essentially an office structure, and the finish of the interior is consequently of the simplest character. The structural walls, exterior and interior, are of hollow tile, with fireproof floor construction. The exterior facing is of rough textured brick laid in Flemish bond and ranging in color from buff to light brown. The terra cotta used in the cornice, belt courses, and around the entrance is light brown in color, with the ornament executed in low relief. The soffit of the arched entrance loggia and the frieze under the wide overhang of the tiled roof are plaster with allegorical decoration in color, painted by Mrs. Edith M. Magonigle — an example of mural design in harmonious relation to architecture. The frieze is pierced at intervals with windows behind heavy grilles that have been painted and checkered to conform to the colorful devices of the panels.



TWO APARTMENT BUNGALOW, MILWAUKEE, WIS.
GEORGE B. FERRY, ARCHITECT

EDITORIAL COMMENT

WITH this number we institute a new size for the page of THE ARCHITECTURAL FORUM. The change is made from 10¾ x 13¾ inches to 9 x 12 inches. The greatest reduction has been made in margins rather than in that portion of the page which is given over to type matter and illustrations. By referring to the rule shown on this page it will be seen at once just what the actual reduction is in text pages, and again by referring to Plate 1 comparison may be made between the former size and the new for plate illustrations.

In changing to another size we have been influenced by practical considerations, all of which were carefully weighed. It is our conviction that although size and bulk have been reduced, affording greater ease in handling, the value of our work to the subscriber will not be diminished — on the contrary it is our purpose to increase that value. Again by making the reduction, we have approximated the limits recommended for the standardizing of all class publications. Any saving effected as a result of our new page dimensions will be shared, in one way or another, with the subscriber. We feel certain that the step taken is in the right direction; that it is progressive, and that it will enable us to render a larger service at a minimum price. — *The Publishers.*

ARCHITECTURE is one of the few professions which has not constructively organized its efforts in the direction of properly coping with the present unusual situation. When any one cries "wolf," architects seem to adopt immediately a pessimistic policy and draw more closely within their shell and think how bad the future is going to be. This is so injurious to the profession itself and to the public at large that it is time something was done to stimulate efforts and coordinate endeavors with the other fields of industry.

Business is good in most lines. Money is plentiful and may be had on relatively easy terms for legitimate projects, and the real estate market shows strong indications of activity which will increase rather than decrease. There is, then, no real reason why architects acting within the limits of the prescribed code of ethics should find themselves without sufficient work to be remunerative.

It is obvious that conditions at the present time are not conducive to the same volume of business as during times of peace and prosperity. The demand of the government for materials and supplies for the construction of the various buildings, ships, etc., which are now under way or projected, is, of course, unprecedented in our history. Contractors are not able at the present time to forecast what the future prices of materials may be or what deliveries they may expect from factory or mill. Prices are following the economic law of "supply and demand," and are at a point which at first glance seems prohibitive. On the other hand, there never has been a time in the history of our country when other fields of endeavor were so tremendously overwhelmed with unfilled orders and showed such accumulated profits. The natural tendency and the natural aftermath of the war conditions will be to divert into legitimate, sound business channels these profits which have been made possible by the conditions of war.

Every architect should endeavor to prevent the diversion of the funds accumulated at the present time from real estate and building developments in general and assist in presenting legitimate investment possibilities to those in whose charge the war profits are now placed. The recent bond issue and the subscription to the American Red Cross are sufficient indications of the fact that at present there is no lack of money in the country. This surplus money might well be diverted in part, at least, to building and real estate development channels.

The architect is in the position of an arbiter or judge and his judgment, if sound, affects not only the owner of real estate and the prospective property owner, but also contractors, material men, and labor.

Real estate brokers depend in large measure on the judgment of architects as to the merit of a project and also as to the possible resultant profits. It is imperative, therefore, that each architect should be conservatively optimistic rather than stampeded into a pessimistic view of the building and industrial situation, and form an opinion of

This rule shows the size of the text pages in former editions of The Architectural Forum.

business conditions based on a careful analysis of the real estate and money markets, as well as the material and labor fields.

Suppose that the lack of building should be based on a fundamentally sound economic basis. There are other fields than the commercial and public buildings which the architect can investigate and toward which he can direct his energies. Undoubtedly this would tend to maintain his business and furnish employment to men in his own office as well as men under the direction of the various contractors who would be affiliated with the work.

In war times the building of munition factories, cantonments, base hospitals, and buildings of like character afford an unusual opportunity for the engineer, but this is a field in which the architect should become interested and which belongs to him as legitimately as do commercial buildings and residences.

It may be a debatable point as to whether or not an architect can be more efficient in the construction of factory buildings than the engineer; but it is not debatable as to which is likely to produce the better results, when utility combined with beauty are considered. The architect should endeavor to get some of this work and show to the country that buildings of a similar character constructed by engineers, while possibly beyond criticism from the standpoint of construction, do not present the same attractive appearance as the solution of the problem rendered by the architect.

In such problems architects can efficiently controvert the idea that none but an engineer can successfully build economically and still give the owner the same arrangement and layout so that his business will be conducted with the minimum of wasted effort.

Many laymen consider an architect as an artist who loves to dabble in colors and consider problems in æsthetics and who objects to regard seriously the importance of constructional elements or details of even lesser importance. They also feel that an architect's first tendency is to set aside all ideas the owners may present and force the acceptance of his own opinions regardless of the cost of the completed operations. This is only too true in some instances, but it is not true of the whole profession.

Many engineers regard the services of the architect as an unnecessary and expensive luxury. Why? Because some architects turn to engineers for a solution of the simplest problems which they themselves should be able to solve and which they must solve if they wish to gain business under conditions such as now exist in the building field.

Very many architects hesitate in "going after work," fearing that they would violate the code of ethics of the American Institute of Architects—but this is not necessarily so. An architect has certain legitimate ways of securing business without competition or without entering the field of other architects and endeavoring to steal their commissions. The architect who sits quietly in his office and does only such business as comes to him rather than use all possible efforts to get new business through his own efforts, is the one who to-day is probably most surely criticizing the "high prices" and bewailing his fate.

Prices are high. There is no advantage in trying to argue otherwise. But will they ever be lower, taken as a whole, and under what conditions? If we assume that the price of building materials is the only thing which has advanced, the relative purchasing power of the dollar has been terribly distorted, and an investor would be unwise in doing anything except what is actually necessary in the building or investment line. Such a condition, however, does not exist, and while building materials are high, almost everything else is equally so, and it is plainly the duty of architects to call to their clients' attention the fact that the relation between prices of building materials and other staples is relatively about the same now as it was in 1914 before the war, or as it was in 1897.

In the period immediately following a declaration of war, the countries involved must undergo a readjustment. The extent of this is dependent upon the previous preparation for the crisis. We in this country were not prepared either in a military or a business sense, and it is obvious that our readjustment must be accompanied by a condition more or less chaotic. After the country, however, has fully realized the seriousness of the work before it and adjusted itself to the new conditions, business will move on in as brisk and systematic a manner as before. It is up to architects to do their part. We can afford no "slackers" in the profession. Each one must do all he can to keep business as nearly normal as possible.

If business does not come in fast enough, go out and get it. If estimates come in unusually high, go out and discover the cause and, if necessary, vary construction and materials to produce the desired results. If steel is not obtainable, use something else. Invent new methods of construction or combine parts of various systems. Whatever is done, or left undone, do not complain of lack of business until every effort has been put forth to find it or create a demand for it.

There are in every city many opportunities for building, real estate development, and remodeling which in times of peace are not promoted. These may be brought into the market by a little extra effort on the part of the architect. An architect has ideas which are valuable and there is no good reason why he should not present his ideas through personal effort, provided he respects the ethics and dignity of the profession.

The thing for all members of the profession to do is to "get busy." Nothing can be gained by sitting around waiting for peace, and not much more can be gained by sitting around waiting for business. Present conditions may, after all, develop into an opportunity to show the stuff of which we are made. We must fight by the side of the army and navy and give them support by maintaining business rather than repressing it. *Do your part and do it now.*

BOOK NOTES

SPANISH ARCHITECTURE OF THE SIXTEENTH CENTURY. By Arthur Byne and Mildred Stapley. 436 pages. 80 plates. 140 text illustrations. G. P. Putnam's Sons, New York. Price, $7.50.

The period of the Renaissance in most of the European countries has received copious study and attention from the many critics and students of architecture, and it has been a general thought that little more was to be said or discovered. One country, however, still remains as a fertile source of new inspiration for the student — Spain with its many marvelous examples of elaborately decorated civil buildings erected in the sixteenth century. In the limited survey of Spanish architecture that had been made previously, attention was confined chiefly to the Gothic period which preceded the Renaissance, ignoring that distinctively individual architecture called *Plateresque* founded upon the picturesque semi-Moorish stucco architecture.

In the present book the authors have made a study of this sixteenth century architecture and present to their readers a general view of the subject which should have a wide appeal. Their recent book, "Rejeria of the Spanish Renaissance," treating of the beautiful iron work of the same period, gives ample proof of their sympathetic appreciation of the style and their ability to transmit its beauty through the medium of text and illustrations to their readers.

The text presents a brief historical sketch of the development of the style in Spain, biographical matter concerning its chief exponents, and a discussion of the Spanish domestic plan, together with critical appreciation of the more famous buildings. The volume was written primarily as a practical book for architects, but its story is told so interestingly and its illustrations so adequate that it will be found entertaining at any time and for any person desiring to acquaint himself with the history of the period.

CITY PLANNING PROGRESS — 1917. Compiled by the Committee on Town Planning of the American Institute of Architects. Edited by George B. Ford. 207 pages. 228 illustrations. The Journal of the American Institute of Architects. The Octagon, Washington, D. C. $1.50 paper. $2.00 cloth. Postage, 20 cents extra.

In its publication of "City Planning Progress in the United States, 1917," the Institute's Committee on Town Planning has brought to completion a most comprehensive digest of the subject. The data covers what has been accomplished, or is projected, in city planning in all cities of the United States of over 25,000 inhabitants, and in a few cities and towns where the population is even smaller but where the work is of special interest. The mass of material thus obtained has been so condensed and the unimportant and irrelevant matter so fully eliminated, that there is told in something less than 200 pages, clearly and interestingly, the city planning ambitions and achievements of between two and three hundred communities, accompanied by pertinent illustrations.

Its contents is furthermore of exceptional timeliness, for events happening as recently as a month before its publication are fully described. It is in all the most complete and authoritative treatment of the subject to be obtained to date and as such should meet with favor from architects and all others interested in this subject which has such an important bearing on future social conditions.

MECHANICAL EQUIPMENT OF SCHOOL BUILDINGS. By Harold L. Alt, M.E. 111 pages. 160 illustrations. Cloth. 8 by 10¾ inches. The Bruce Publishing Co., Milwaukee. Price, $2.50.

The successful operation of the modern school building depends to such an extent upon its mechanical equipment that the problem of selecting and making provision for such equipment is one of the serious duties of the architect. In the present book there is brought together detailed consideration of heating and ventilation, toilet room and other plumbing fixtures, water systems, sewage disposal, power plant, swimming pools, electric lighting, vacuum cleaning, and fire protection. As an outgrowth of practical experience on the part of the author this book should prove a ready and useful reference in any architect's office concerned with the design of schools.